## SEPTEMBER FOOD TECHNOLOGY


**FOOD TECHNOLOGY**

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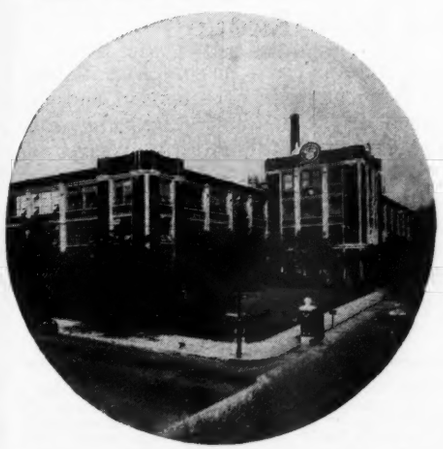

This small reproduction of the picture on the cover shows the plant of E. J. Brach & Sons at Chicago. This factory is one of the largest candy manufacturing plants in the United States, and it is a well-engineered factory. This photograph is another in the series of *Food Industries'* cover pictures illustrating the homes of famous foods.

# FOOD INDUSTRIES


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# This Issue

## He Saw Them Go Hungry

Sidney Jaffe was in Paris when the Nazis took possession, and he remained in France for some time afterward. So while the French were stewing in the confusion of their conquest, Mr. Jaffe made a study of what was happening to their food supplies. What he reports on page 39 would easily land him in a concentration camp if he were not now in America.

His report will give you a most interesting insight into the plight of the French. And moreover, it will indicate the magnitude of the job of feeding Europe which will undoubtedly fall into the lap of the Western Hemisphere after the war is over.

## Oldest Learns from Newest

Dehydration is one of the oldest arts employed in the preservation of food. Quick freezing is the newest. Yet, the dehydrators have learned something vital from the freezers about quality control. And with this borrowed knowledge they are going places. It is all a matter of inactivating enzymes, but turn to page 53, and let L. V. Burton tell you about it.

## Bit of Educated Guessing

The demands of defense on the food supply of the United States, in so far as the Army and Navy were concerned, were discussed in FOOD INDUSTRIES in 1939—and there is yet no reason to revise that picture. Food supplies in this country are even more plentiful than was the case two years ago. But lend-lease shipping of large quantities of food to Britain, and possibly to other countries, has upped prospective demands. What will be needed—and how much—can only be guessed at now. The dimensions of the task change from week to week, as the war progresses. For some educated guessing by G. L. Montgomery, see the article on page 62.

## Don't Be Color Blind

Color is becoming increasingly more important in food products. Identity of product and acceptable appearance have long influenced food manufacturers to control color. And now the extension of close quality control in manufacturing, fostered by AMS inspection and government grading of foods, has made color control essential. Fortunately, improved means of color determination and analysis are now available, making color control easier. Gordon W. McBride, Washington chemical engineer who writes frequently for FOOD INDUSTRIES, tells the story, starting on page 41.

# Coming

## Can You Keep It a Secret?

If you have developed a good formula you naturally want to keep it to yourself. As you do the temperatures, pressures, mixing procedures and what not that are vital to the translation of the formula into a product people want. But keeping others, even your own employees, from getting wise is a bit of a problem. There are, however, several tricks and precautions which will confuse the inquisitive or keep them in the dark altogether. You can, for instance, shift the scales on thermometers. This and other methods will be described by W. R. Van Meter, Kingston Cake Co., Kingston, Pa., who writes with a background of many years experience in the baking industry.

## Making Chemist Pay Way

Some of the smaller food plants that have never employed scientifically trained help have been toying with the idea that they should hire a chemist. This is only natural, for all outstandingly successful food companies depend largely upon technical personnel. But if you have never used any technical help, you may be at a loss as to how best to use a chemist. In which case you will get some valuable ideas from an article to be published soon, based on one chemist's personal experiences.

## Why Detergents Deterge

Necessity for a high degree of cleanliness, of both processing equipment and containers, makes the food industries employ large quantities of alkaline cleansers or detergents. Food plant men know from experience that some of these are better for their purposes than others. But few know just why. Therefore, FOOD INDUSTRIES plans to publish an article telling how these detergents work, discussing briefly which types are useful for various purposes, and their relative effectiveness in carrying out cleansing operations. The author is none other than Foster D. Snell, well-known consulting chemist of Brooklyn, N. Y.

## Safer, But Not Safe Enough

Superintendents of food factories are to be complimented for reducing the accident frequency rate by 5 percent and the severity rate by 8 percent in 1940. But the frequency rate is still one-eighth higher than the all-industry average, indicating need for further improvement. Plants can be made safer, however, only if the major accident hazards are known. Which is why they will be revealed in an article to be based upon findings of National Safety Council. This summary of accident experience in food plants shows where the danger spots are likely to be found.

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# FOOD INDUSTRIES

FOR THOSE WHO CONTROL QUALITY
THROUGH MANAGEMENT AND PRODUCTION

LAURENCE V. BURTON, Editor SEPTEMBER, 1941


# The Talk of the Industry

● Those bold and daring souls who go on a rampage and write an anonymous letter to the editor are ordinarily a source of merriment except when they are not. One of the latter gently protests the use of tin for oil cans when the government is exerting its efforts to build up a reserve of this strategic metal.

Well, friend, your protest is hereby recorded. But it is unnecessary, for most oil cans have been made from terne plate (75 percent lead and 25 percent tin on a steel base) since about 1938. When next you visit a filling station, take a tin can along and compare them. Terne plate is duller than tin and is distinguishable at a glance.

● "Help" for Russia has been proposed by the Associated Farmers of California in a resolution recently adopted by its board of directors. The board proposes to ship to Russia all our Reds, saboteurs, labor racketeers, and "parlor pinks without any

thoughts of priorities for American schools and universities."

It is to be hoped that Harry Bridges will be the first to embark on this happy voyage.

● After a lengthy legal battle, the use of the paper container for milk in Chicago has been further advanced toward a legalized status. The U. S. Circuit Court of Appeals denied the city's appeal and directed the lower court again to enjoin the city from enforcing an ordinance that would require milk to be sold in standard milk bottles. The ordinance, according to the court, is contrary to State policy. Although the whole affair is malodorous, it appears to be far from settled, even yet.

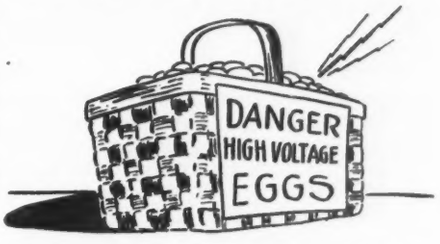
● If the Senate approves, our old friend and fellow worker in the food industry, Rexford Guy Tugwell, one-time vice-president of American Molasses Co., is to be governor of Puerto Rico in addition to his job as chancellor of the University of Puerto Rico. It all goes to show what a splendid springboard the food industry is.

● Carbonated-beverage manufacturers face a new problem of competition for supplies. A recent caller on Food Industries was a manufacturer of citrate of magnesia who was on the warpath because he could not get crown closures. This deficiency of supply is the result of priority restrictions on the use of cork. He said he was ready to "bust the whole soda water business wide open." Verily, a crown salesman's life must be an exciting one.

● The Italians are beginning to show more acumen than they heretofore have been credited with possessing. *Critica Fascista*, published in Rome, says editorially that the war may last ten years. Pleasing prospect!—yet more likely to be true than the forecast of a short war.

For the United States food manufacturer, let it be said that it is wisest to plan for a long war and hope for a short one. Small plans never win battles or wars, or even business success.

● Rumor has it that it is possible to determine whether an egg will hatch a strong chick by means of the e.m.f.




(electromotive force) developed by the fertilized egg. Eggs with a strong e.m.f. invariably produce good chicks while those which have a weak e.m.f. fail to hatch. This method is said to have been developed in Geneva, Ill., for use in a commercial form of egg tester to show whether eggs are worth incubating.

If the method be accurate, writes O.H.C., only those eggs that are not hatchable should go into cold storage or direct consumption before the hatchable eggs are used.

● What is meant by the word "consumer"—a word enjoying a current

vogue in Washington—seems to be enlarging, or even undergoing a change.

Sometimes "consumer" is used to mean the housewife when she is out making her daily purchases. Again it seems to refer to the women and children—never to the men-folk. At times "consumer" seems to refer to the entire public. And at other times it refers, apparently, only to the poor.

A representative of Consumer's Union appearing before the Food Processing Section of the National Nutrition Conference for Defense unwisely expressed the view that apparently he was the only representative of the "consumer" in the room, despite the presence of a number of women who were older than he. They promptly took him apart in an elegant and ladylike manner. One in particular said she represented all the "consumers" in the city of New York, numbering several millions, most of whom were the unorganized and inarticulate masses, not merely the few thousand who belonged to a specialized group.

The speaker was Laura Caudle, for a great many years Deputy Commissioner of Markets of New York. Her concept of the consumer as a term to represent all the public seems to be the soundest of all the shades of meaning that attach to the term.

## Vital Things For You To Do

The pinch of shortages has only begun to hurt. You haven't seen anything yet. Every new munitions plant, every new airplane plant, tank plant, shipyard or other defense works that is now coming into production is going to create a growing succession of insatiable demands for almost everything you may need, even if your needs are only in modest amounts. The demands of the defense industries will grow and grow, and keep on growing until the shooting is all over.

Food is as important for the defense program—especially for keeping Great Britain going—as bombers, fighters and steel. But food is not yet in the category of munitions and armaments. OPM is not lying awake nights on food matters, and for that reason all food manufacturers must be on the alert to cooperate in every possible way or they may find themselves out in the cold when it comes to getting the necessary equipment and supplies as they are needed.

If you have not yet acted on our last month's suggestion to place the proper statistics of your part of the food industry before the priority division of OPACS, you are missing a big bet. But your responsibility does not rest there, for if any of your business is of a defense character, if you are producing for the Army, Navy or SMA, you have an obligation to yourself to do even more.

Motors, engines, tools and everything you need that you normally buy from distributors or manufacturers' stocks are subject to OPM priority orders. Under existing conditions a manufacturer or distributor can replenish his stocks only if the OPM is satisfied that what he purchased has gone into an essential or defense industry. If, alas, he is not able to replenish his stockroom, you may not be able to get what you want when next you need it.

### *What Can You Do About It?*

You can help the manufacturer of your motors, tools and equipment to get an A-10 rating if you are making foods for the armed forces or SMA. You can do this by identifying those of your orders that are needed for this defense work. You can also aid by furnishing a monthly notarized affidavit stating the percentage of your defense sales to total sales. If questionnaires come to you on this phase of your activities you should fill them out gladly and promptly. This is your safeguard of supplies for the future. It is in addition to your cooperation with OPACS as suggested in the August FOOD INDUSTRIES.

To sum up:

1. Identify your defense orders, if any, giving the contract, project or preference rating covering the work.

# Hors d'Oeuvres

• *A food manufacturer has adopted the trade-name, "Wild life in the Kitchen." Well, there are those who like that sort of thing.*

• The F&DA recently seized a shipment of sardines because the cans were slack-filled. Is nothing sacred?

• *At Clendenin, W. Va., a grocery store collapsed and fell down an embankment to the edge of Elk River. Heavy food prices, most likely.*

• Henry Ford last month unveiled his plastic automobile. This car of tomorrow has a body made of such raw materials as soybeans, corn and wheat. That's putting food into the can.

• *The "peachapple" is a new fruit accidentally developed by a dentist in Augusta, Ga. It is said to have the flesh of the peach and the skin of the apple—the flesh you like so much with the skin you love to touch.*

• Tokyo has cut the price of ice cream sodas and sundaes from 20 to 13 sen. Which seems like a very, very nice thing indeed. But on the contrary, the idea is to put price below cost and discourage vendors from selling such luxuries. Clever, these Jipponese.

• *The Japs also cut the price of "coffee." Incidentally, their "coffee" is a mixture of barley and roasted beans ordinarily used as cattle feed and fertilizer. Wonderful thing, totalitarianism.*

• Coals are still being carried to Newcastle. The "West Point" sailed from New York recently with spaghetti for Italy.

• *Those of us who mourned the passing of Elsie, the Borden cow, have been surprised to learn that there never was an Elsie. Various cows, it seems, played the role of Elsie. Now don't tell us there isn't any Mickey Mouse.*

• According to Package Machinery Co., 60 percent of consumers consider protection from dirt, dust and germs as the first requirement of the package. Second is maintaining quality. But would you send your best girl two pounds of choice chocolates in a cheese box?

• *At Radio City in New York, onions, cabbage, tomatoes and other vegetables grow on a terrace on the 11th floor. Which at Radio City is relatively in the basement.*

• The Navy in the next year plans to buy 936,000 lb. of hops. Must be something brewing.

• *A lone rider of the purple sage shoved his six guns in their sockets, reached for a canopener and emptied the juice of a can of tomatoes down his parched gullet. It tasted like more and the recipe spread, because the cowboy had found a welcome substitute for "gyp water"—rainwater which collects in small pools on the plains and becomes heavily impregnated with gypsum and other alkali salts. The cowboys were among the first to use tomato juice as a beverage, but not the last—production in 1939 was 13,752,115 cases.* F.K.L.

2. If No. 1 is impossible, analyze your sales by determining the percentage of your total dollar sales volume that was delivered to defense buyers in previous months.

3. Obtain an analysis of the distribution of what you sold by submitting to your customers the standard approved form of affidavit prepared by the priorities division of OPM.

4. Users of industrial supplies should obtain the highest possible percentage figure which can be supported by accurate means of analysis. This is of value to distributors of industrial supplies for it, in turn, will assure the manufacturer of supplies that he may obtain the required raw materials to manufacture new products for defense orders in advance of receipt of actual orders. Otherwise you may have to wait for what you need to be made to order and the waiting may be lengthy.

The foregoing four steps are, however, applicable only to defense orders. If your firm is engaged only in civilian supply, then your only recourse is to OPACS, as indicated in the August FOOD INDUSTRIES.

## Never Stop Selling!

Selling is one function of any industry—including the food industry. Though selling is no more important than any other function, such as production, there are occasional times like the present when a seller's market will lull a sales department into easy-going ways. When normal times, which is to say—tough times—arrive, it is not easy to reacquire the ginger and pep and go that are needed for successful selling.

How to sell vigorously in a seller's market is just as difficult as it is to buy sanely and wisely in a buyer's market. In either case no enduring good is created by exacting all the toll the traffic will bear, or by taking the easy way.

Under today's conditions the seeds will be sown that will bear fruit or cockleburrs when normal times—tough times—come again. The current price rises and demand for nearly everything is strangely reminiscent of 1916, despite the efforts of OPACS to hold prices down.

In 1916–17–18 you could get almost any price you asked, provided you could deliver the goods. It was a temptation to prove the superiority of one's lines by ascertaining the highest prices charged by one's principal competitor, then adding a dollar to that unit price and letting the stuff go. By one's ability to get more than any competitor in 1916–18, one's vanity was gratified. Consumer acceptance was so good, it was erroneously thought, that the highest price was justified.

Alas. What goes up must come down. And the companies that kept their prices and inventories as low as was possible reaped the benefits of their earlier constructive policies in the years from 1920 onward. One company that fell hard for the higher priced export market of those war years suddenly awakened to the loss of its domestic market. But it was too late. The competition had never stopped selling.

Selling involves many things beside the mere calls of salesmen. It involves management, price policies, sales promotion, advertising, credit policies, distribution, service and what not. Vigorous selling in a seller's market is difficult because there is no simple measurement of its effectiveness, such as volume of goods sold, until times change and it becomes a buyer's market.

When the buyer's market comes, then you will find out whether or not you have utilized the golden opportunity to create an enduring demand for your goods.

We repeat now what we said editorially in August, 1940: "Never stop selling." Once you allow yourself to become an order taker you are lost, for this time you will not have any big cash reserves to tide your firm over while you are again learning how to sell.

## Miscarriage Of Food Technology

A miscarriage of food technology is the only term applicable to the production of semi-perishable food items that have an edible life of only four or five days. Specifically, the current gripe is against saltine crackers from a fairly well-known cracker baker. These crackers were purchased within a half day after delivery by the manufacturer's own truck and for 24 hours were very palatable. But after 48 hours had elapsed the crackers began to go off flavor.

Of particular interest is the fact that the head of the company is one of those who is positive that nothing but distribution problems are to be found in the food industry—that no production problems exist at all.

Production problems and distribution problems go hand in hand and affect each other mutually, obstinate opinions to the contrary, notwithstanding.

## What Do You Make of This?

"Stale bread freshens up nicely with freezing. Some folks make a practice of buying stale bread by the sack from bakeries and freezing it as an economy measure. One lady bakes a two-week supply of bread and then freezes the whole works. Want to make graham crackers crisp? Freeze them. Freezing takes out the excess moisture."—D. M. Rutherford, *Pacific Rural Press*, page 441 of the June 14, 1941 issue.

If freezing is all that is needed, the problem of commercial stale bread should be easily solved.

Will some one who has the necessary experimental facilities test this out and report to FOOD INDUSTRIES?

## Descriptive Vs. Grade Labeling

Sorry that we could not get around to "A Study of Certain Attitudes of Women toward Canned Fruits and Vegetables" before now. This is a study made for the National Canners Association by Elmo Roper, apparently to find out whether women preferred descriptive labels or "grade" labels on canned foods. The booklet can be obtained free from the Association's Washington office. It is copyrighted with the express stipulation that "reproduction of isolated portions of this report, out of their context as part of Mr. Roper's findings as a whole, is, however, expressly forbidden." Which sounds as if the Association is either wise in the ways of wicked statisticians or else it wishes to evade or avoid disputes on its conclusions.

Also this proviso appears to prevent discussion of details of the report without reproducing it completely, which space limitations prevent doing here.

In general, the report seems to make out a pretty good case for descriptive labels versus "grade" labels. Yet it fails to distinguish between the common or garden variety of grades A, B and C and U. S. Grades

A, B and C. This, however, is a minor comment, for neither are yet in sufficiently widespread use to be important factors in consumer buying.

If anyone decides from our comment that we are actively campaigning for U. S. grading or are opposed to descriptive labeling, he is mistaken. FOOD INDUSTRIES believes in adequate labeling by whatever system experience proves best to promote the purchase and sale of foods, be they canned, frozen, dehydrated, raw or what have you. We also believe that as long as the choice of the system of labeling is on the permissive status, rather than mandatory, the experience of the next ten years will automatically attract food manufacturers to the method that is best suited to the needs of the public. If the recent experience of the few who are utilizing the services of AMS to get U. S. grades on their labels should be duplicated by the many (more than 200) additional concerns who are now on the waiting list to get U. S. inspection and grades, then the outcome is easily forecast. For those who utilize it now have learned that the public will pay a premium price for food bearing U. S. grades. (This will be a shock to the New Deal zealots who demand compulsory U. S. grading for all foods as an economy for the consumer and as a national defense measure.)

Mr. Roper's study is an important milestone in researches to determine what goes on in the consumer's mind. But it should be remembered that the consumer's attitude is not static. New consumers are born every year and old ones die. And some of those who survive occasionally change their minds.

Therefore, if this research should be repeated in about five years, in a form that will give comparable results, yet considerably amplified in the light of experience, it will be an important basis for executive decisions about labeling policy.

For the technical and production man, the Roper report also holds a very definite interest, for the implication is clear that quality control, difficult as it may be in the canning of many crops, will loom larger and more important in the years to come. And this is certain whether the labels bear descriptions or U. S. quality grades.

For any top management that is vitally interested in retaining descriptive labeling, it is imperative that quality be controlled throughout all operations. For after all, AMS inspections and U. S. grades place a premium on quality control and up to now have afforded a means whereby the manufacturer has been able to cash in on his investment in the AMS service and make a profit on it.

Descriptive labels on foods of variable quality cannot compete in the long run with descriptive labels on foods of standardized quality. The question which the future will decide is whether descriptive labels on standardized quality can compete with certified labels on standardized quality.

## Look After Your Plant Equipment

Maintenance forces in the food industry have a far greater importance than ever before in the past 25 years. With OPM declaring that every metal is soon to be rationed by a priority system, it is obvious that replacement equipment will be increasingly difficult to acquire—more difficult than to take good care of the equipment that is on hand.

The situation is growing so acute that some of the shops which make machinery that customarily is rented to food manufacturers are now running 24 hours a day making machine tools on A-1-A priority ratings. Try to get a replacement from such a place! Others are filled up with munitions or defense contracts.

All employees should be cautioned to take extra good care of the equipment under their supervision. Lubrication schedules should be overhauled and revised to be sure that no undue wear may occur. Rusting should be prevented by proper painting or rust preventatives. Careless bumping of trucks or dropping of loads should be eliminated entirely. Electrical equipment should receive equally careful scrutiny and protection. Overload relays should work at the proper setting to avoid a possible burn-out of the motor.

In short, wise factory management will institute a thorough check-up on every feature of the plant to make sure that every possible precaution is taken to prevent or avoid breakdowns. If an experienced man with foresight and imagination is assigned to study the whole problem, he may save you many vexing delays. Conceivably he might discover that a sump or catch-basin needs cleaning lest it be the indirect cause of a small flood that might cause a short circuit. Or he might discover a rotted sill that, if neglected, might cause some machine to get out of alignment and chew up its bearings, spill a lot of goods, or something worse.

It would be surprising to learn that any spectacular discoveries were made in the foregoing manner. But, there is no telling how long the emergency is going to last. In which case, it is desirable to take the same precaution that one would if it were necessary to make one's present equipment last for an indefinite period.

## Defense-Plant Strikes Are National Disgrace

Strikes in defense industries are not only a disgrace but are an unmitigated evil. The United States has the next to the worst record of days lost by strikes in the entire world. According to figures supplied by the Canadian Ministry of Labor for the year 1940, the number of days of work lost by strikes per 1,000 employed in English-speaking countries are listed in the following table:

| | |
|---|---|
| United Kingdom | 55 |
| New Zealand | 65 |
| Canada | 95 |
| United States | 170 |
| Australia | 714 |

The fact that Australia is in a worse situation than the United States is no little comfort. And it should be recalled that the principal instigator of labor strife in this country is Harry Bridges, the Australian, who emigrated here a few years ago presumably to seek larger opportunities for his chosen activity.

It is fantastic to believe that there is anyone in the country who wants the war prolonged. Yet sabotage of defense production by strikes will delay the time when peace can come again. It may even do more than that. It may weaken the resistance of the opponents of aggression at a crucial period and thereby compel the United States to engage in hostilities at an inopportune time.

Character and integrity are at a low ebb indeed when agreements not to strike but to arbitrate differences are broken by strikes even before a reasonable trial period has been given. Men who strike under these circumstances should be required to do a turn in the Army at Army pay to learn something about discipline.

# WHY FRANCE GOES HUNGRY

By SIDNEY JAFFE
New York, N. Y., (recently of Paris).

**Nowhere have you seen a more interesting and rational account of what happens to a country's food supplies in the wake of the Nazi blitz. Knowledge of the food situation in the occupied countries will help you to evaluate the task of America's food industries after the war is over.**

EVEN as the rumble of guns died down and the last bridge was blown up to stem the enemy's advance, the French began their forage for food which was so desperate last fall and winter. I have recently returned from Paris. I was there during that tragic period of the entry of Nazi troops into Paris. I saw the hordes of refugees, uprooted from their homes, fleeing pell-mell to the south. I saw the transportation system paralyzed and the frantic efforts to restore it before stocks were depleted. Then I watched the hunger pangs grow tighter, as the nation attemped to return to normal, as the invading troops settled down to live off the land. I saw what war does to normal food production and how quickly existing food surpluses can be eaten.

### *Hidden Hunger*

Today, France, like other parts of Europe, is in the throes of both "hollow hunger" and "hidden hunger," as American nutritionists term it. The evidence is unmistakable, though not easy to see. People do not starve quickly under a strict rationing scheme as the French have installed. They grow sallow instead, children less energetic, illnesses spread easily and are more often fatal—the tone of life goes down. In Paris when I left, the rations of bread, butter, meat, sugar, cheese and potatoes were cut down to one-third of the barest minimum. Chickens, eggs, fish, milk and fruits, all unrationed items, were practically off the markets.

Housewives waited hours all winter in the marketplaces for a few items to supplement their family diet. And several hours in a mid-winter Paris drizzle means a bad cold or worse, especially with homes cold for lack of coal. Women swapped a handful of salt for an egg, a piece of bacon for two cans of milk, with dried beans the rarest delicacy. Until January the law prohibited sale of all dried beans so as to tide them over the weeks when fresh vegetables were most scarce on the markets.

After living in German-occupied France it is not difficult to explain why Frenchmen are hungry. One can arrange the reasons in two classifications. First there is the direct effect of the ravages of war in actual destruction and in disturbed production. Secondly comes the effect of requisitioning by the German army in France.

Before the fighting began in the fall of 1939, mobilization of farm labor and horses and the feeding through the winter of some three to four million soldiers lying idle in the trenches, producing nothing, ate heavily into existing stocks. Then came the battles which destroyed electric systems throughout the country and smashed dairy farms. Silos were torn down. Cattle were scattered and a great part of them eaten by soldiers on the march. For three summer months of 1940 the whole section around Paris was paralyzed because bridges were blown up and unrestored, because farmers had fled before the rain of steel, leaving their crops untended to spoil in the fields, because no fuel could be obtained for transportation. Then came the occupation.

The Germans cut off a territory running across the north of France from Havre to Amiens and Rheims, to which Frenchmen could not return, or, if there already, could not circulate, because of Nazi military preparations against Britain. This action cut off a rich cattle grazing and truck farming section which normally fed Paris. And from this section the Germans requisitioned most of the rolling stock. Some estimated that as much as 60 to 80 percent of the total rolling stock, varying

*Photo from Three Lions*

**If a housewife in Germany or in a Nazi-occupied country is so fortunate as to have any coffee or cocoa left, she usually divides her provisions over a period of at least six months, according to a report by a refugee. Here are two ways of doing it. The biggest portion of the cocoa is saved for Christmas.**

in different sections, was taken. This caused a severe shortage for normal French needs, with a resultant high cost of transportation. Government decrees attempted to hold prices down, but this often resulted in a complete disappearance of certain items from the market, despite severe punishment for horders.

Grain became so rare this spring that farmers were forbidden to use it for feed. Cattle and chickens were therefore slaughtered in large quantities as feedstuffs grew more expensive and hard to find. Eggs were rarely seen in the marketplaces all winter. Food dealers suffered most from lack of transportation. German officers controlled all motor fuel, allowing about 5 gal. per month to French dealers who could give documented evidence that their business was vital to the feeding of Paris or other densely populated sections.

The problem of fats is the most pressing in the French food economy since imports from the colonies were largely cut off, and the fat supply was the first to be hard hit by the war. There is practically no soap, housewives learn to cook without fat, machines work only part time—every drop of fat or oil to be found is guarded carefully by government decree. Under German encouragement the French this spring planted a large acreage in soybeans to obtain oil and feed concentrates—French farmers had hitherto neglected the soybean.

French newspapers stated that German authorities made agreements with French food officials as to the exact quantities of food they would take over. No figures were given. They called it a "moderate" quantity, and, of course, the Germans did not "take"; they bought—with occupation marks. These newspaper stories were published primarily to ease the minds of Frenchmen and to quiet rumors that the Germans were taking everything, for the average Frenchman could well believe the Germans were taking everything after a few hours' search in the marketplaces. It is impossible for anyone to know with accuracy how much the Germans do take, but there are many indications which give a close approximation.

### *Nazis Quietly Take Food*

On a bicycle trip down to Biarritz from Paris, I saw German trucks in the main market centers of Bordeaux, Poitier, Orleans, Tours, everywhere, but seldom more than one in each marketplace at a time, always inconspicuous. They would load up in staples, paying in marks. French dealers had no choice but to sell. Marks circulate as well as francs, and the Germans do not haggle about the price.

The Germans are the only ones who have cars and enough gasoline to go out to individual farms to buy things. I talked with many a farmer who told me how the Germans drive up in their army trucks, ask how much butter or eggs he has, and then buy half or three-fourths the total supply. If the farmer appears suspicious they search for more, and if they find it, they "insist" that he sell all he has hidden.

At the so-called "stomachs" of Paris, one can see the grey army trucks filling up and the soldiers paying out in marks The Germans have special eating houses, formerly swanky French restaurants, now requisitioned. A great many items which require no ration card are bought in the marketplaces by German soldiers. Fruits, nuts and candies are among those items. This drain on the French food supply is not ascertainable, but it is heavy.

There has been an estimated one to three million German soldiers stationed in France, not to mention German civilians who came to live in Paris after their homes had been bombed. All bought what they wanted of unrationed items. The great mass of soldiers were in the north, but thousands were strung out along the railroad lines as far south as the Spanish border. The Germans could not possibly have organized transportation to so many small units scattered a thousand miles over hundreds of towns. These units simply bought a great part of their food from local farmers and local markets. There was no doubt about that. It was physically impossible to export from Germany to them, though the Germans claimed doing that.

The Germans substantially relieved food pressure in Germany by an important but little recognized method. Thousands of head of German horses were grazed, all summer and winter, in the rich pasture of the north and all along the coast as far down as Biarritz. Farmers were obliged to allow them to graze in their fields and in addition to sell certain quantities of fodder required by them. This reduced the pressure in Germany, leaving her fodder for her cows while French fodder fed her horses. If one estimates that approximately 12 lb. of fodder produces 1 lb. of dairy products or fresh meat, it is more clear why Parisian babies lack milk while great numbers of French cattle are slaughtered for want of feed. It is an important point. Fodder is the backbone of a nation's food supply.

### *Slow Hunger Makes Pacificists*

American journalists make hasty conclusions from the evidence of hunger in France. They tell Americans that hunger makes a potential powder keg, and increases the German problem of keeping subject peoples quiet. My observations call for a different conclusion. For modern hunger, with modern means of spreading the hunger out thin over the people by controlled rationing, simply produces fatigue and dullness. There is always a little to be had by everyone. So one just waits long weary hours in the food lines, and grows, not angry, but discouraged and apathetic. Politics and revolt are not the main topics of whispered conversations. Rather one whispers about a local food bootlegger who has eggs at 15 cents each—and how one can arrange to get them.

*Photo from Three Lions*

**Almonds are one of the many food items among the missing in German occupied countries and in Germany itself. So housewives collect cherry pits and lay them out to dry. The core of the cherry pit tastes something like the almond and makes a usable substitute.**

# QUALITY CONTROL

Ways To Determine the Important Factor of Color in Foods • Colloidal Stabilizers and How To Use Them • Why All Coca-Cola's Taste Just Alike • Research Laboratory Studies Seafood Problems • Digest of AMS Standards

# How To Tell What Color It Is

By GORDON W. McBRIDE
Chemical Engineer, Washington, D. C.

**Food color, always an important factor in consumer acceptance, and now of great importance for quality-grading purposes, can be measured and controlled by means of various laboratory devices.**

HOW green are canned green beans? How yellow is butter, or salad oil, or mayonnaise? How orange is an orange with "color added"? How white is white flour? In short, what has color to do with the food industry?

Whether we like it or not, the color factor in the selection of food by the ultimate consumer is significant. A nice deep-red piece of beefsteak appeals to the consumer much more than a piece of meat that is a pale red, or perhaps even a reddish-gray. A bright-red apple likewise will probably please teacher more than one that is not so colorful.

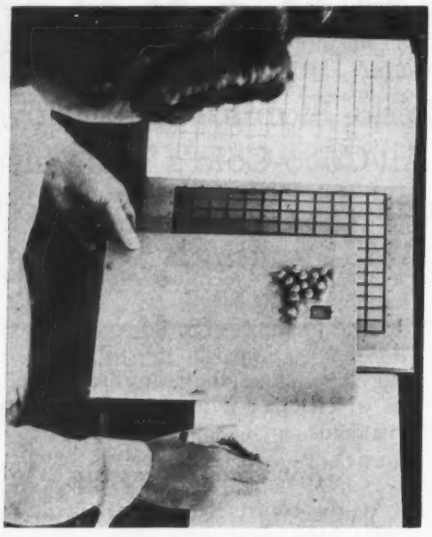
More fundamental than these consumer reactions is the fact that color is often a significant gage of quality. A certain degree of color may indicate that a food is in the prime quality class, or that it is in the substandard class.

Many quality standards including a color factor have already been officially established. Both fresh and processed fruits and vegetables are so graded. For example, the Agricultural Marketing Service tentative U. S. standards for grades of frozen peas include specific minimum shades of green which the peas must meet. Peas which are lighter in color than one of the specified colors may not be graded above U. S. Grade B, for example. The Food and Drug Administration also has prescribed in its minimum quality standard for canned tomatoes a specific shade of red below which color the tomatoes must be graded as substandard.[1] Fats and oils, meats, dairy products, poultry and eggs are among the many other foods in which color is important in quality standards.

### *Apparatus Necessary*

In the control laboratories of nearly every food plant some degree of color measurement or determination is or should be part of the job. Often this is only visual inspection, but in many cases very exact and reproducible measurements must be made. At times, important differences in color are so small that they are difficult to detect with the unaided eye. Apparatus for assistance in measuring or comparing colors is then necessary. Wide varieties of equipment are available, some simple and some complicated. Even the photoelectric cell is often used to replace the human eye for this purpose in a number of electrical-optical color measurement systems.

Richard S. Hunter of the Photometry and Colorimetry Section, National Bureau of Standards, working with the multipurpose photoelectric reflectometer that he designed for measurement of the color, apparent reflectance and specular gloss of materials.



**The color of a food sample may be compared with color plates in a Maerz and Paul color dictionary, as shown here for grading peas. The sample is placed on a mask that is held over the dictionary and moved about until the plate is found that most nearly matches the sample in color. This method is used by Agricultural Marketing Service grading inspectors.**

Since color is what one sees, or thinks he sees, the judging of food products by eye might be thought sufficient. With good observing conditions, the trained eye can rival the best photoelectric colorimeter in the detection of small color differences. Furthermore, the human eye compensates to a surprising degree for various kinds of illumination. Unfortunately, however, this is not true of all objects, nor is it true to the same degree for all inspectors of food products. In addition to this, we cannot overlook the fact that some people are "color blind", though only about 5 percent of our population is so affected.

For such reasons as these, and because even persons with normal color vision do not see colors exactly alike, the control or elimination of the personal equation from color grading is always important. The use of various instruments that provide standardization of all conditions surrounding color control, and have no ability in themselves to make unwanted adjustments, provides the only reliable means of reproducing color measurements. Ability to reproduce these measurements means that products of uniform color can be shipped day after day, without a gradual change in color slipping by unnoticed.

Closely related to color determination is the measure of turbidity. Many of the same principles of optics apply to both analytical methods. However, a turbidimeter is not a means of measuring color changes. Actually, it is a measure of variation between transparency and opacity. If there is a color change as turbidity changes, suitable adjustment may have to be made to account for the color variation.

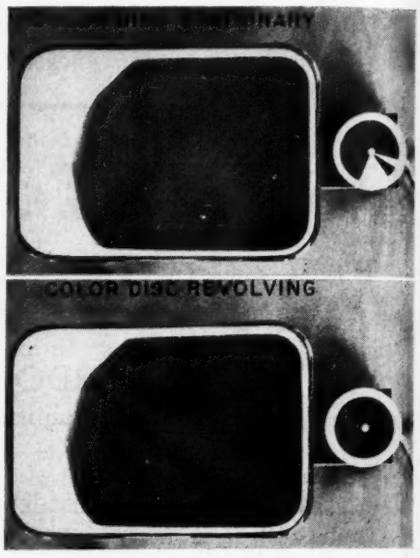
### *What Is Color?*

Color is more than just a hue. The color of a substance is defined by three characteristics: Hue, lightness and saturation. (In the Munsell system the latter two are known as value and chroma, respectively.) Consider first the simple variation from black to white through shades of gray. Imagine what would happen if red were added to these colors: White plus a little red would give pink; black plus a little red would give a very dusky red; if the same amount of red were added to a medium gray, the result would be a weak red. If more and more red is added to each of these, a vivid pink or a vivid red might ultimately be reached. This illustrates how one may start with a definite "lightness," choose a "hue" and add a certain degree of "strength" or "saturation": The result is color. Comparable color designation has been standardized for all the other principal hues. Classifying colors in this way makes plain their three dimensions.[2]

"Grape juice is purple." "Grape juice is red." Both statements are correct, yet red and purple are quite different hues. What is the explanation? When a glass of grape juice is viewed it usually looks purple because the light which is *reflected* from it is of that color. But when the glass is nearly empty and only a thin film of grape juice is left on the inside of the glass, then it appears red. Here the color is determined by the *transmitted* light. This is well illustrated by the accompanying chart which shows the percent light transmission through a sample of grape juice over the entire length of the spectrum. Grape juice thus is red when viewed with transmitted light because nearly all the transmitted light is at the red end of the spectrum. A similar analysis of the reflected light shows that a considerable proportion of blue light is also present; the red light added to the blue gives purple.

### *Color Determination*

Before naming the color, it is important that proper technic for determining the color be followed. A light source, and a method of measuring the light reflected from or transmitted through the object, must be provided. The angle of incidence of the illuminating light must be carefully controlled so that conditions are reproducible. The examiner must avoid reflection of light from the surface of a glass container. Reflection of colored light from a wall or an object in or outside the room must be guarded against. It may even make a difference whether the operator's coat is white or brown, or some other color.




**A revolving disk using Munsell papers is used to grade the color of tomato catchup. The exposed area of each of the colors (red, yellow, black and gray) is adjusted while the disk is stationary. When the disk is revolving, the blended color is observed. Adjustments are made among the four colors on the revolving disk, until a color match between the disk and the catchup is obtained. The relative proportions of the four colors are a factor in determining the grade of the catchup.**

When reflected light is to be measured, approximately comparable results may be obtained by following one or the other of the two "approved" methods of illumination and observation: (1) The incident light should strike the object at an angle of about 45 deg., and the observer should view the object from a vertical position; preferably the light should come from the left or the right rather than from straight ahead. (2) The incident light should be vertically above the object; the observer should then view the object from an angle of approximately 45 deg. If a curved surface is being examined, care should be taken that direct reflection of the light source is not encountered from a cylindrical surface or from parallel grains.

Whichever method is used, the effect of stray light should be minimized by placing a piece of black material either directly in front of the observer, under and behind the object, to serve as a background against which to view the sample, or as a canopy over the ob-

server and sample. The object is of course to avoid reflection of a colored surface in the surface of the test sample. Better yet is a "dark room," or specially designed booth, for color determination only. The ceiling and upper walls of such a room or booth should be finished in a nonreflecting black for some color measuring purposes. For others a gray is preferable, to avoid too great a contrast.

Courtesy Electrical Testing Laboratories

**Hardy recording spectrophotometer, used in determining light transmission and reflection curves like those shown in the accompanying chart.**

### *Lighting Important*

When the color of transmitted light is to be measured the illumination should be directly behind the object in the line of vision of the observer. Of course, the light source should be diffuse and uniform over the entire area to avoid inaccuracies resulting from uneven lighting.

The choice of illuminant is, of course, very wide. Daylight is the one most often used for general matching work. Light from a north sky is generally preferred because it is the most nearly uniform for the greatest number of hours in any one day. Care should be taken that no direct sunlight may enter at one time of day or at one season, and not at another.

There are disadvantages in using daylight, however: The worker is limited to a few hours in the middle of each day; a cloudy day may produce results quite different from a clear one; reflection from the brick wall of a neighboring building may cause serious variation in the color of the light; a tree near the window or skylight may give a green cast to the light in the summertime; snow on a nearby roof may reflect very intense light on winter days; and daylight itself is far from constant.

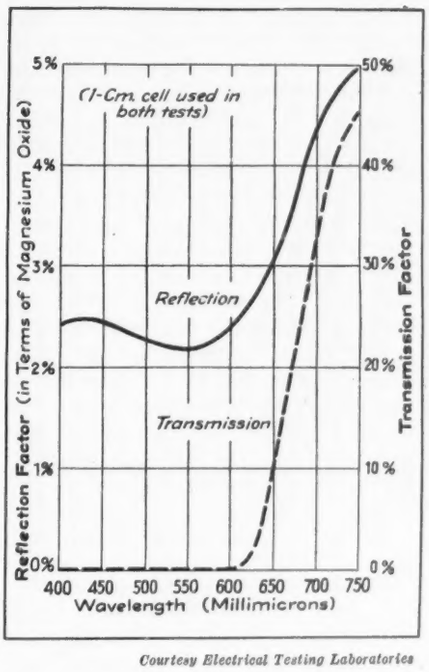
For 24-hour-a-day service artificial illumination must be used. Here again there is a wealth of technical information available on light sources.[3] But one must first decide whether a light is wanted under which *differences will* show up, if they are there, or a light under which the colors will be seen as *in daylight*. In general, any source of light may be chosen as long as it is uniform from one test to the next and if one knows the results to be expected from its use. Ordinary incandescent illumination may be perfectly satisfactory for some cases. The blue bulbs called "daylight" (a misnomer, carrying implications that are not true) may be preferred when a bluer light than yellow tungsten is necessary, e.g., to examine yellows. Or the new fluorescent type of illumination may be chosen.

Whatever the source of light, it should be selected with care, and once selected should not vary from one test to another, or from one time to another. The amount of illumination must not be allowed to change by neglecting to replace old bulbs or by permitting accumulation of dust in the equipment. Exclusion of all daylight is generally preferable for an artificial light control system.

### *Color Control*

The simplest method of color control is to compare the object with a standard by eye without the use of any meter or optical instrument. The standard may be a color chip on a Munsell chart, or one of a set of Lovibond glasses, or a color panel prepared as a standard to simulate the ideal color, or perhaps a random sample arbitrarily chosen as a standard. Whatever the standard is, care must be taken that it is kept clean and that it does not change over a period of time. The usual type of standard should be kept in the dark between observations, and long exposure to strong light or excessive temperature changes should be avoided.

In addition to working standards used daily for manufacturing control, there should be a set of secondary or reference standards for checking the working standards at suitable intervals. In many industries, color is of such importance that manufacturing routine calls for regular comparison of these secondary standards with primary color standards at the National Bureau of




Courtesy Electrical Testing Laboratories

**Chart showing the color of grape juice by reflected light and transmitted light. Curves show the percentage of light of each wavelength that is reflected from the surface of, or transmitted through, a cell one centimeter in thickness containing grape juice. Since only a small percentage of the light is reflected, the scale on which this reflection curve is drawn is shown as ten times the scale of the curve for transmitted light. Although the thickness of the cell makes little difference in the reflected-light curve, the transmission curve will vary greatly with the thickness of the cell. For example, if the cell had been two centimeters thick, much less than 45 percent of the light of 750 millimicrons wavelength would have been transmitted.**

Standards in Washington to assure unvarying quality.

### *Analyzing Color*

Discussion so far has been concerned chiefly with matching of colors as they are seen, rather than as they may be broken down and analyzed. For many reasons it is often desirable to break down and analyze color, perhaps by measuring or recording only the intensity factor of the transmitted or reflected light. This may be done by any number of photometric arrangements. The percentage of total light which is reflected from the object may be compared with the amount reflected from the surface of a block of magnesia, which is frequently chosen as a white standard. Or, if it is transmitted light, it may be compared with the amount of incident light, or of light transmitted through a standard sample.

To carry this method of analyzing color further, the reflected or transmitted light may be compared with a white standard under light of single wavelengths. This method of color analysis is called spectrophotometry and is the only method that is complete and primary. By this method, a ray of colored light of a single band of closely related wavelengths is focused on the object and standard. This ray, generally made by dispersing some reproducible light source through a prism, is part of a small spectrum, or man-made rainbow. The wavelength of the ray is varied during the test from one end of the visible spectrum to the other, either from the red to the violet end or vice versa. The amount of reflected or transmitted light of each intermediate wavelength may be measured either by eye or by a photoelectric cell as percentage of standard. In the most expensive type of instrument it may even be automatically recorded.

### *Absolute Method*

The spectrophotometer, as long as it is in calibration, gives reproducible data and thereby provides a means of long-time absolute comparison. Slight variations in color can be detected when accurate data for each wavelength interval are available for both test sample and standard sample. This method therefore gives a quick means of analysis, either quantitative or qualitative, as desired. For qualitative results it may be sufficient merely to compare the data, or curves representing the data. The usual type of automatic instrument will produce a spectrophotometric curve in five minutes or less. If quantitative results are desired there is a considerable amount of calculation involved, requiring half or three-quarters of an hour additional for each determination.

However, when one has the results of spectrophotometry and knows that certain factors affect the color, a series of standards may be prepared with known variations of one factor at a time. By observing in what part of the spectrum the sample differs from "standard," the source of the difficulty may often be determined. And by noting how great the deviation is, the approximate extent of deviation from standard may be estimated.

Color as a means of quality control offers many more possibilities than outlined here.[4] With a little ingenuity, a food plant can make its competitors blue over the loss of business, or perhaps green with envy—sometimes it's hard to tell blue and green apart anyway! In any event, it will help keep the enterprising business out of the red.

***Acknowledgement***

The author and FOOD INDUSTRIES gratefully acknowledge the assistance and critical review given by Miss Dorothy Nickerson of the Department of Agriculture and by K. S. Gibson, D. B. Judd and R. S. Hunter of the National Bureau of Standards, whose expert comments and suggestions have been very valuable.

NOTE: *Color is too important a subject to dispose of in a single article. The author and the editors of "Food Industries," therefore, invite further comment and information. It is hoped that in later issues we may present more specific examples, either "horrible" or complimentary, which will be helpful to the numerous readers who must give attention to this subject. These comments can relate to methods of measure-*

*(Turn to page 84)*

# What You Can Do With Colloidal Stabilizers

By W. C. COLE
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**PART I — Stabilizing agents perform important functions in food processing. They aid in obtaining and retaining desirable qualities. The agents and the equipment employed in making emulsions, suspensions and foams, and the results obtained, are described here.**

IN the food industry, as elsewhere, permanence or stability of a product is often a major consideration. Some foods or delicacies owe much of their desirability to certain physical properties. Obviously, maintaining these good qualities is desirable. In such instances "colloidal stabilizers" may play important roles. These stabilizers may function in many ways; but the question of preventing undesirable changes, once the desirable state has been established, is always primary.

Ordinarily the stabilizing agents are colloids. They may vary considerably, depending upon the systems under consideration and upon the purpose. Thus emulsifying agents that actually stabilize emulsions of various types can rightfully be called "stabilizers." The selection of an emulsifier, however, will depend upon whether one desires to prepare and maintain an oil-in-water emulsion or a water-in-oil emulsion. In selecting other stabilizers one must consider whether foams or systems containing suspensoids are to be stabilized; whether gelatine is necessary, as in jelly manufacture; or whether it is desired to prevent the growth of ice crystals in ice cream or other frozen foods. In addition, the presence of electrolytes and, often, the nature and magnitude of the electric charge on the particles directly or indirectly affect the stability of various systems.

Although permanence of a system is often of primary importance, in the food industry it is often desirable to destroy a certain physical state as a means of facilitating processing. Foam is a frequent offender. Many devices

in the dairy industry, as well as other branches of the food industry, are used to eliminate foam at certain stages of the processing, whereas at another stage foam may be highly desirable.

Stabilizers may function in more than one capacity. In one instance a certain property may be utilized, whereas in another case another characteristic may be helpful. A stabilizer may sometimes exhibit both functions at once, but in other instances its action in one capacity may limit its ability to act in a second. This will be determined by the system as a whole.

### Classification

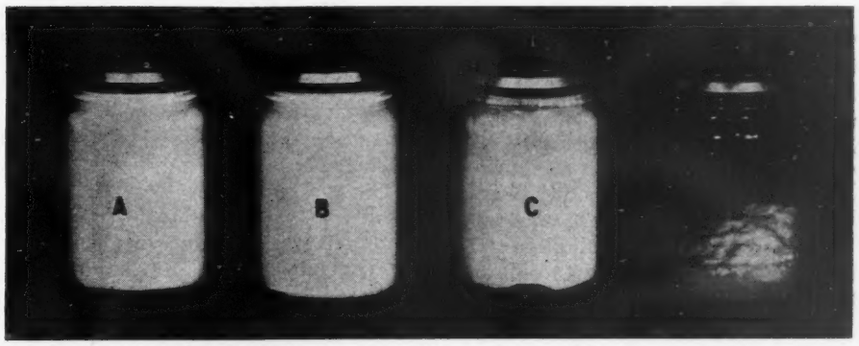
Stabilizers may be classified in several ways. For our purpose, however, we will consider (1) those that stabilize emulsions (emulsifiers); (2) those that stabilize suspensions (that is, prevent or at least retard the precipitation or settling out of substances in suspension); (3) those that stabilize foams (retard the collapse of gaseous bubbles); (4) those that stabilize jellies as a result of gelation; and (5) those that stabilize the texture of frozen products such as ice cream and other frozen foods by retarding or preventing the growth of ice crystals.

### Emulsifiers

Regarding oil-in-water emulsions, it is generally agreed that an emulsion cannot be stable or permanent unless a third phase is present—except sometimes in relatively low concentrations. Such a substance, acting as a stabilizer, concentrates in the interface between the oil and water, lowers the interfacial tension and increases the stability of the system. Were it not for this phenomenon the oil droplets or globules would ordinarily coalesce, whereupon the emulsion would break or be destroyed.

This principle is utilized in the manufacture of mayonnaise. In the so-called American method, the emulsifying agent and acid are combined, and the oil is added gradually during heating. Recently[9] this method was compared with a "compromise" method whereby the emulsifying agent was combined with a little oil before addition of the acid, and the remainder of the oil was added gradually as in the method described above. Each of the two methods was carried out under two conditions: (1) Where the oil was introduced beneath the surface of the emulsion, and (2) where all the oil was dropped into the emulsion from about 6 in. above the emulsion surface. Fresh egg-yolk emulsifier was used in these comparisons.

From this study the authors conclude that the stability and homogenity of oil-in-water emulsions of high-oil content are less when an air film adheres to the oil phase than when such a film is absent; in both methods, introducing the oil below the emulsion surface gave better results. They further claim that the emulsions made by the "compromise" method surpassed, in stability and homogenity, those prepared by the American method.




**Effect of storage temperature upon the stability of mayonnaise. The samples for this comparison were prepared from a quart bottle of commercial mayonnaise. *A*, Control sample stored at room temperature. *B*, Sample stored 3 days at 45 to 50 deg. F. and 3 days at room temperature. *C*, Sample stored 3 days at 32 to 35 deg. F. and 3 days at room temperature. *D*, Sample stored at 15 to 20 deg. F. for 3 days and at room temperature for 3 days. The emulsion in samples *A* and *B* is stable, whereas in sample *C* it shows partial instability and in sample *D* practically complete instability has occurred.**

The emulsion in mayonnaise can be broken by storing at sufficiently low temperatures. If pectin is used under suitable conditions, in addition to other stabilizers often employed, the stability of mayonnaise is less susceptible to temperature changes.

### Emulsifying Equipment

Aside from the method used in preparing mayonnaise, there are many ways of making emulsions. Among the various types of equipment, colloid mills and homogenizers should be mentioned. Colloid mills vary somewhat in design and are used in pharmaceutical preparations, in certain food products, in the manufacture of paints and for many other purposes. Homogenizers and viscolizers are of the same general type, being high-pressure pumps with special valves. They are used primarily in the dairy industry for processing evaporated milk, ice cream mixes and homogenized milk and for making reconstituted milk. But they serve in other industries as well.

Often, as a check on the efficiency of processing or preparing oil-in-water type emulsions, one should check the degree of dispersion. This work can be done by measuring microscopically the size of the fat or oil globules. Staining technics are often helpful in such examinations. Nile blue sulfate has been shown to have special merit.[7] It consists of red and blue fractions, both of which are water soluble, whereas the red fraction is also fat soluble. Under the proper conditions it stains the fat globules red and the water phase blue, thereby giving sufficient color contrast to facilitate microscopic examination.

The dairy industry offers a very good example of a natural emulsion. Milk, though a very complex system, is a natural oil-in-water emulsion. The factors responsible for its stability are, however, the same as in an artificial emulsion. In other words, milk would not be stable except for the presence in the system of a suitable stabilizing agent. The "membrane substance" that normally surrounds the fat globules in milk and thereby stabilizes the emulsion is different from any other substance in milk; but any one of several other milk constituents could likewise act as an emulsifying agent. Stable emulsions can readily be formed by homogenizing milk fat with skim milk or, for that matter, with solutions of any one of several proteins present in milk.

Recently, in this connection, an interesting observation was made. According to Tarassuk and Palmer,[21] the substitution of the naturally occurring membrane for others results in hydrolysis of milk fat that materially affects the curd tension of milk.

Many pharmaceutical products depend upon emulsification for their preparation. Emulsions of fish-liver oils, sometimes containing accessory flavoring principles, are among the preparations that may be considered by the food industry.

It should be realized that gelatine and various gums, as well as certain phospholipids, are often employed in the preparation of food emulsions. In addition soap, saponin, sulfonated oils and certain similar products can be used as emulsifying agents in other in-

dustries. Finely divided solids have also, in certain instances, been shown to be effective emulsifying agents, both for oil-in-water and water-in-oil emulsions.

Generally speaking, water-in-oil emulsions are less frequent in the food industry than oil-in-water emulsions. Butter is considered by some as an example of a water-in-oil type emulsion. But although the moisture in the butter is distributed as minute water droplets, the fat and water separate quite readily when the butter melts. By definition, an emulsion consists of one liquid dispersed in another liquid. On this basis if the fat in butter solidifies, as during storage at low temperatures, it could not rightfully be called a water-in-oil emulsion.

Clayton [4] cites many instances in which oxidized oils have proved to be effective emulsifying agents for water-in-oil emulsions. Gum dammar and cholesterol can also be used.

Water-in-oil emulsions are used in preparing certain ointments and paints as well as in certain foods such as French dressing. Lanolin is a well-known agent for preparing water-in-oil emulsions in cosmetics and pharmacy.

### *Stabilizers for Substances In Suspension*

In colloidal suspensoids, electrical charge plays an important role in stability of the system. The addition of emulsoid-type colloids to such a system may be used to increase its stability.

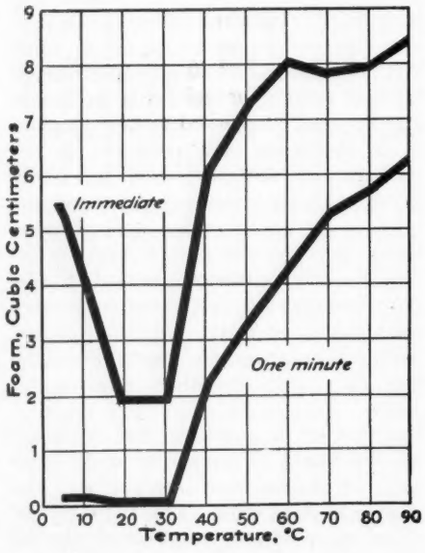
Although this principle is applied in the food industry, an additional factor has frequently to be considered. Since the suspended particles are beyond colloidal dimensions, electric charge cannot play such an important role; furthermore, this increase in size of the suspended particles increases the tendency for them to separate out. This is true of many beverages and juices.

Those interested in fruit and vegetable juices should refer to the book by Tressler, Joslyn and Marsh on that subject. These authors [22] point out that whereas in the early development of the fruit-juice industry all juices were clarified and stabilized against subsequent precipitation, the trend today is usually towards a cloudy or pulpy juice. The main exceptions to this statement are clarified apple cider and clarified grape juice. The use of cans and dark-glass bottles has done much to eliminate the objectionable appearance where settling occurs.

Both cloudy and clear apple juice (cider) are produced. It is generally agreed that filtration improves the appearance of cider, but much of the flavor is lost by such a process. Marshall [17] claims that clarified juice is preferred in Michigan. According to Tressler and his coworkers,[22] clarified cider can be pasteurized without developing a cooked taste, whereas ordinary cider acquires the flavor of apple sauce as a result of pasteurization. According to these authors, clarification may be accomplished by (1) treatment with tannin and gelatine; (2) treatment with an enzyme preparation; (3) flash heating; and (4) as in one plant, the use of bentonite as a filter.

Various methods have been developed for the processing of grape juice. To prevent sedimentation after marketing, argols must be removed. The juice, heated to 170 deg. F. to 190 deg. F., is filled into jugs or carboys while hot, then stored in a cool cellar for four months or longer. This process can be speeded up by freezing and thawing the juice. When a clear juice is desired, pectic enzymes may be added. The removal of the protective colloids by this treatment facilitates crystallization of the crude tartrates.

With tomato juice, stabilizers are not added. But steps are taken to preserve the pectins by inactivating the pectin-destroying enzymes through heating or other means. This method tends to maintain a high viscosity, which in itself retards the settling of particles. Kertesz [14] has shown that pectin-methoxylase (pectase) occurs in tomatoes. When the cell structure of the tomato is destroyed, this enzyme gains entrance to the pectin. Its action consists in splitting off methyl alcohol and leaving pectic acid, thereby destroying the important colloidal properties of pectin.




**Foaming ability of milk containing 3 percent fat. Measurements taken immediately and after 1 minute indicate relative stability of foam at various temperatures (data from Leete).**

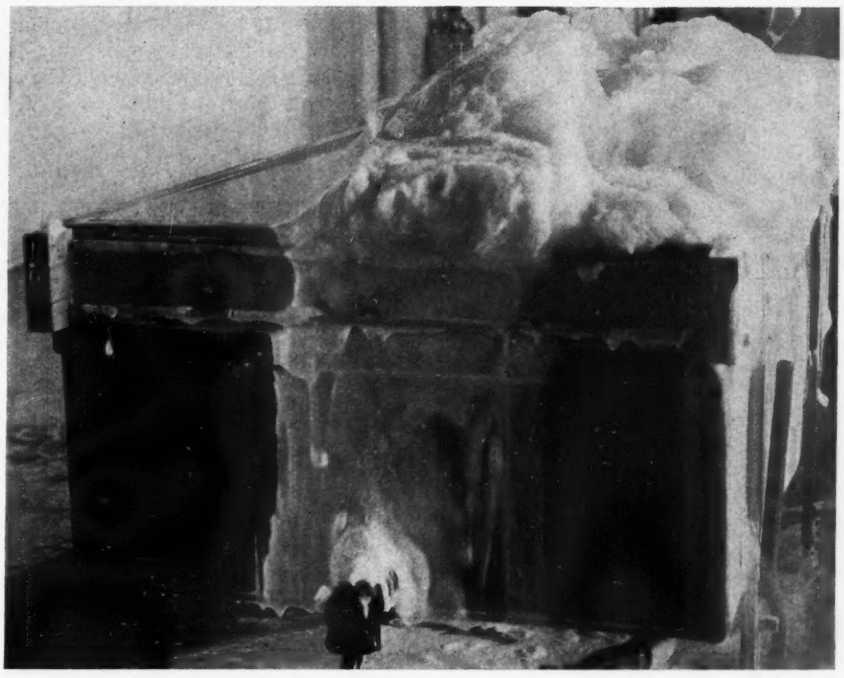
As Kertesz demonstrated, this enzyme of tomatoes is completely inactivated by heating the juice to 80 deg. C. (176 deg. F.) for 45 seconds. Because of certain spore-bearing anaerobes for which tomato juice is a favorable growth medium, processing temperatures higher than this are necessary.[10] As a further precaution, the product may be homogenized or viscolized to decrease particle size, thus further lessening the danger of separation.

With juices from citrus fruits, one must control the process in such a way as to avoid extraction of oil from peel and the bitter substances present in certain fruit tissue (for example, naringin, a lemon-yellow crystalline glucoside, present in grapefruit). Grapefruit and orange juices are canned to a greater extent than are other citrus juices. Normally in such products there is only slight settling of insoluble solids, and the body of the products remain cloudy. Naturally occurring pectins are responsible for the stabilizing of colloidally dispersed solids. Joslyn and Sedky [13] studied the effect of temperature, holding time, and pH upon the inactivation of pectin-destroying enzymes in citrus juices. They found that the enzymes in oranges and grapefruit were somewhat more heat-resistant than those in lemons, and that heat inactivation was more rapid at pH 2.2 than at pH 4.

Pineapple juice, used extensively, is obtained from four different sources. This is reported [22] to be 40 percent from material formerly diverted to crushed fruit, 25 percent from drainings from crushed pack, 20 percent from eradicator pulp and 15 percent from cores. Centrifugal force is used to regulate the desired percentage of solids, and heat is used to coagulate proteinaceous material, besides preserving the juice.

Churned cultured buttermilk is a dairy product in which considerable lactic acid has been allowed to develop. Often it contains butter granules, formed as a result of churning all or part of the product. Excessive churning causes "wheying off" or settling of the milk proteins, due presumably to their denaturation. Churning only a portion of the product can be used to control the defect. Sometimes the cultured milk is not churned at all, but butter granules are added directly to it. An alternate procedure is to spray liquid milk fat into the cold culture, where it solidifies, giving the appearance of butter granules.

The settling of cocoa and the rise of fat in "chocolate-milk" drinks are both objected to because these products are then not uniform in composition and because this separation detracts from their appearance. Ordinarily, homo-



**Milk foam in instances of this type is not only bothersome, but wasteful. In this instance dry foam (allowed to drain 15 minutes) weighed 0.22 lb. per gallon, whereas wet foam weighed 1.3 lb. per gallon.**

genization is resorted to for minimizing the fat separation. Commonly, also, tapioca flour, sodium alginate or a similar substance is used to increase the viscosity of the drink, thus reducing the tendency toward cocoa separation. Such highly viscous products are objected to by some, who omit the stabilizer in order to obtain a more refreshing and palatable drink. The industry is not agreed on the best procedure.

### *Stabilizers of Foams*

Generally speaking, foams, as well as emulsions, are three component systems. They may be considered as emulsions having a gas instead of a liquid as the dispersed component. As a rule the presence of a "stabilizer" is necessary for their stability, but foams are less stable than emulsions. The physical chemistry of foams is well reviewed by Berkman and Egloff.[3]

Under proper conditions surface-active substances, such as organic salts and acids, sugars, glycerins, alcohols and esters, readily form foams. When dissolved in a system they lower the surface tension and are absorbed in the interface. The results obtained, however, vary with concentration, solubility and viscosity, as well as other factors.

Although solids may also act as foam-producing agents, the solid phase may lose its foam-forming ability through the addition of a substance which is insoluble in water but which wets the solid better than does water. Thus in such systems wetting ability is an important consideration.

In the beer industry foam is considered a necessary characteristic of the product when consumed. Gelatine, albumin, peptone, and saponin are recognized as foam agents. Recently Gray and Stone [8] tested these substances and have reported results showing that the protein and hop resins of the foam complex can produce a satisfactory stable foam in concentrates much lower than would be true with any of the stabilizers mentioned above. According to them, a foam density of 20 was obtained when the nitrogenous substances, calculated as protein, comprised 0.007 percent and the hop resins were present to the extent of 0.0019 percent. The exact nature of the foaming agent in beer has apparently not been fully established, although its importance is recognized.

Under present methods of manufacture, regulating the proportion of malt and starch adjuncts added or changing the temperature of fermentation offers a means of regulating the dextrins in beer; and these dextrins in turn influence the foam characteristics. In some instances heated malts are used to give the proper "head" and to increase color. Excessive colloidal material in beer gives a cloudy product, especially when cold. This is "cold haze." In such cases papain may be added to digest the colloidal proteins. If, however, the latter are completely removed, beer loses its carbon dioxide-retaining capacity to a certain extent and may not form a satisfactory "head."

According to Gray and Stone,[8] the slight sedimentation usually called "organic matter," which often appears in bottled beer, is undoubtedly due to denaturation and coagulation of the foam in the neck of the bottle, either during pasteurization or during subsequent trade life.

Ordinarily, foaming is not a problem in the manufacture of wines. But difficulty is sometimes experienced with champagne or in pot-still operation. Since clear wines are desired, colloidal material is removed as completely as possible during the manufacturing. As a further precaution against the appearance of colloidal precipitation such as colloidal suspensions of metallic salts, sometimes the system must be stabilized by the addition of other salts that will prevent such reactions.

In the baking industry eggs are often used for preparing relatively stable foams, whereas in marshmallow manufacture, certain gelatin solutions which may contain other stabilizers as well, are used.

Foams play an important role in the dairy industry. Under favorable conditions, milk foams readily. Temperature is a major factor affecting the

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extent of foaming. Thus at about 5 deg. C. milk foams readily, whereas at about 25 deg. C. its foaming is at a minimum. It also foams readily at higher temperatures. This relationship is represented graphically in the accompanying graph, prepared using the data of Leete.[15] As is obvious from these curves, the ability of milk to foam and the stability of the resulting foam vary considerably with temperature. The results with skim milk and cream differ from those for milk. In addition the results depend upon the treatment such products receive.

As a means of eliminating foam during the handling of milk, "no foam" separators, "no foam" can fillers, "kilfome" mechanisms and similar devices have been employed. In addition, discharge pipes into vats have been placed below the surface of the milk, and pumps operated automatically to maintain the proper level as a means of minimizing foaming.

During pasteurization of market milk, so-called "space heaters" are employed between the surface of the milk and the cover of the vat to bring the milk foam to the desired temperature. Many public-health regulations now insist on this procedure as a safeguard against improper pasteurization.

*Part II concluding this article will be published in the October issue of "Food Industries."—The Editors.*

# Why All Coca-Cola's Taste Just Alike

By EARLE MAULDIN

*"Food Industries,"* Atlanta, Ga.

**One of the "secrets" of the biggest single success in the beverage business is rigid control of sirup quality from ingredients through processing to the container, and even to the retail outlet.**

IN a mixture of 25 tons, an item of 328 oz. seems a very small amount. This, however, is the exact amount of one of the ingredients of "Coca-Cola" sirup—20 lb. 8 oz. in a complete mix of 51,930 lb., which amounts to less than 3 grains to the pound. But Coca-Cola's quality control experts see to it that the proportions and measurements are always precise. In their insistence on this and other factors of quality control lies the secret of uniformity of product.

Because of this strict control of quality, research and control laboratories play an important part in Coca-Cola's operations. Headed by Dr. W. P. Heath, of Baltimore, the research and control workers not only guard every step in the manufacturing process but carry on simultaneous investigations among equipment manufacturers, raw material suppliers, warehouses and supply depots, paint manufacturers and producers of many accessories all over the country.

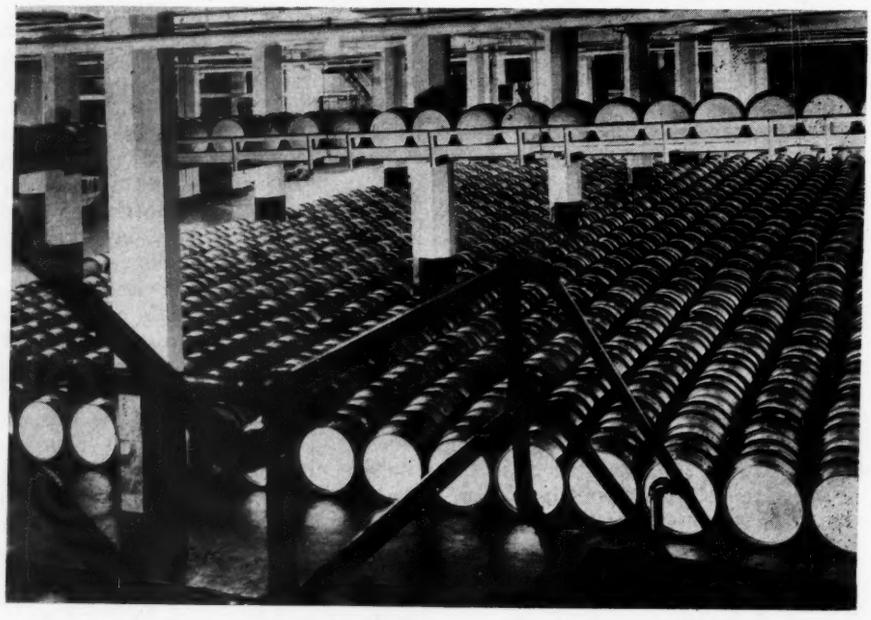
This policy of close control extends also into merchandising. If, for example, any of the unseen parts of the familiar red cooler are to be changed, prolonged tests are conducted to make sure that the change is an improvement. If a new dispensing feature is proposed, rigid investigations are started.

### *All Raw Materials Tested*

But this is a story primarily of quality control in sirup manufacturing. The eight sirup plants, located at strategic points throughout the nation, contain completely equipped chemical laboratories for the control of each step in the manufacturing process. The staff of each laboratory investigates, tests and approves all raw material used. And they also study the problems of the thousand bottling plants.

Water being the vehicle which carries the ingredients of Coca-Cola sirup, quality control starts with the water supply. City water of known standards is specially treated. It first passes through a quartz filter which removes all sediment. Then it receives a type of activated-carbon treatment to eliminate odor and taste—particularly the odor and taste of chlorine which occasionally are present in the water in some cities. Tests verify the effectiveness of the treatment while the water is held in stainless-steel storage tanks.

The ingredient water is drawn as needed into stainless-steel mixing tanks through a special stainless-steel piping system. From filtration of the water to the filling of the package, all ingredients follow a stainless-steel route. As the treated water is used, it is automatically measured by high-accuracy meters.



**The drums on the floor represent approximately one day's output of one sirup factory—enough sirup to make over three million bottles of "Coca-Cola"—waiting shipment to bottling plants in half a dozen states. The drums on the overhead conveyor are empties on their way to the filling line.**

Sugar comes next. Only the top-grade granulated sugar is used, of specified fineness. Therefore, each lot of sugar is checked for grade and fineness. The solubility of the sugar is checked too, a sample being taken at random for each lot and dissolved to make sure that it produces a water-clear solution.

Each ingredient or each article of merchandise is similarly tested to make certain that it meets the predetermined standards.

Although carried out on a large-scale production basis, the blending of the ingredients which go into the sirup must be done with laboratory precision. Everything is measured in pounds and calculated to gallons. In any single batch of sirup, the quantity of which is 5,000 gal.—enough to make approximately 600,000 drinks—variations in volume are held to insignificant proportions.

### *Chemist's O.K. Required*

When a batch is finished, it is tested quantitatively and qualitatively by the chemist in charge. Final tests even include a color check, for every bottle of Coca-Cola must have the same familiar eye appeal. These tests are made immediately, and no sirup is drawn into shipping containers without the chemist's O.K.

In each of the eight factories in the United States where "Coca-Cola" sirup is made, the supervising chemist is "the boss." He and his assistants must make quantitative and qualitative analyses of every ingredient used and every batch of sirup mixed. Only when they approve can sirup be drawn off into shipping containers.

### *Sanitation Is Rigid*

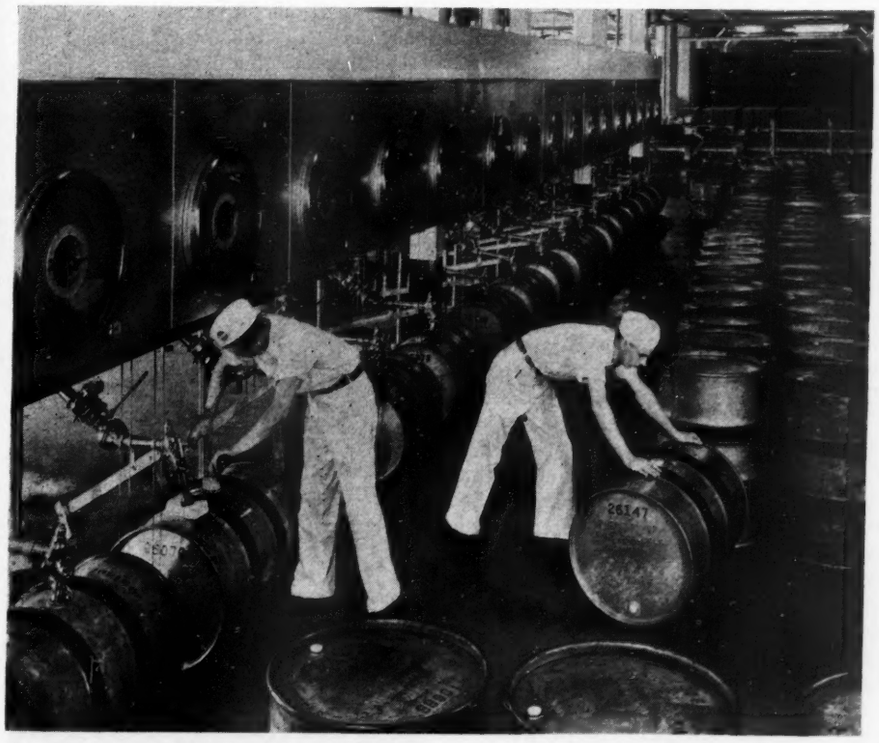
Obviously, painstaking food manufacturing methods can be nullified if the equipment used is neglected. Consequently, cleanliness is a basic principle in all Coca-Cola sirup factories.

Every day, as soon as manufacturing is over, all mixing tanks and the entire system of connecting pipes and valves are cleaned with sterile hot water. Then each unit is rinsed with the same treated water which is used in manufacturing. Before work starts each morning, the equipment and piping system are washed out again.

Quality control extends also to the containers used to carry the finished sirup to market. All packages are given the same type of rigorous cleaning which the factory equipment receives.

Even with the completion of manufacturing and packing operations, quality control is not finished. Representatives of the company call four to eight times a year on every one of the 100,000 soda fountain owners in America. On each call they check sanitation, refrigeration, carbonation and the "throw" of the valve through which Coca-Cola sirup is dispensed. They also "check" and advise the human element to improve and maintain the standards of soda fountain operation. In addition, they help the dealer to merchandise not only Coca-Cola but the whole fountain. That, however, is a story beyond and apart from the subject of quality control.

This policy of rigid quality control every step of the way adds up to close uniformity in the millions of drinks produced every day. And therein lies the reward. For unless a food or beverage product is the same wherever and whenever the consumer buys it, wide acceptance cannot be obtained or retained.



The filling operation is characterized by speed and exactness. Each large mixing tank has six outlets, filling six drums or barrels progressively under the constant attention of two men. Automatic controls weigh the volume of sirup into each drum. Attendants seal each one, roll away fulls and roll empties into place on the line. The stainless steel drums shown here are being filled with sirup for some of the more than 1,000 "Coca-Cola" bottling plants.

# Laboratory Solves Seafood Problems

By HARRY L. WELLS, Corvallis, Ore.

**Works out answer to mold on kippered fish, discovers better method of cooling and cleaning crabs and makes recommendations on freezing temperatures and packaging materials.**

SOLUTIONS to some perplexing technical problems in the fish industry have been worked out at the Oregon Food Industries Laboratory at Astoria. Typical of the problems was a difficulty encountered in kippering fish. In commercial preparation and shipment of kippered fish, one important factor has impeded its progress in distribution and sales. This factor is mold which develops after four to six days of storage at ordinary temperatures. How this product could be preserved for a longer period of time was the problem to be solved by the laboratory. If a solution could be affected, the product could be shipped greater distances, making possible a market more extensive than just that of the Northwest.

### *Inhibiting Mold*

A preliminary study showed that inhibition of this mold growth could probably be accomplished best by dipping the fish into some bactericidal solution. Accordingly, samples of fish at various stages in the process of kippering were dipped into a number of different solutions, and the inhibitory action of the various treatments observed over a period of 2 to 24 days.

In these tests a dip was found which, when used at the proper stage of the kippering process, would inhibit mold growth for as long a period as three weeks.

### *Preparing Crab Meat*

The cooking of the crab prior to canning or freezing has been studied to determine whether it was better to remove the shell before or after cooking. Following the observation of a large number of samples which had been prepared with each method, the laboratory recommended removing the shell before cooking. The technologists reported that a bitter flavor is imparted to the muscular or edible portions if the whole crab is cooked. It was also found that the best method of removing the shell was to remove the back by hand while the crab is still alive, and to completely wash out the viscera in a strong stream of running water. The body may or may not be broken in two, as the operator desires. Usually, however, this step will facilitate the shaking out of the body meat from its segments. It is recommended that the meat be handled as rapidly as possible, since the flavor is very easily lost.

### *Freezing Tests*

Comparative freezing tests at 0 deg. F. and −20 deg. F. are being conducted with crab as well as other fish products. Because this type of study necessitates long periods of storage, no definite results have been made public. Indications are, however, that there is no best temperature for freezing fish products in general. The lower temperature seems to be better for some products, while the zero temperature apparently is superior for others. For a few of the products any temperature within this range appears to be satisfactory.

### *Packaging*

In cooperation with one company in the Northwest, the laboratory worked out a highly satisfactory method for preparing whole frozen crabs for market. The method found most satisfactory was one in which the back shell of the crab is removed in one piece and the viscera completely washed out prior to cooking. After the crab has been cooled, the shell is fitted on the crab and the entire product frozen in a sealed cardboard container. The red crab shell is visible through an oval transparent window in the top of the carton. Highly optimistic about this product, the company is planning a large production of it next season.

In conjunction with freezing studies, experimental work has been done on wrapping materials. Of all the commonly used materials, transparent cellulose was found to be the most satisfactory because of its moisture retention, its attractive appearance, its faculties for being easily heat-sealed, and because of the fact that it imparts no off-odor or off-flavor to the product. One wax paper studied was found to impart a bitter flavor to flounder during the process of freezing.

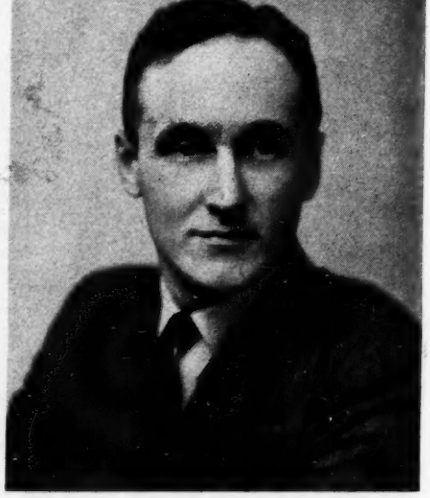
### *Future Work*

Though the studies cited here are by no means inclusive, they are representative of the type of things being done by the laboratory. When asked about plans for the future, Dr. Harvey outlined work that has already been done on the prevention of chemical changes which are responsible for undesirable color and flavor changes. He believes they have obtained some very significant results, and that in the near future a method designed to prevent color and flavor changes in some of the products could be made public.

Manufactured fish products such as pastes, pickled, smoked and kippered fish; and products manufactured from two or more different fish will be worked out in the near future.

### *Harvey in Charge*

The Oregon laboratory is under the direct supervision of Professor E. H. Wiegand, head of the Food Industries Department of Oregon State College. Dr. E. W. Harvey, assistant technologist, has been conducting the research on fish freezing and canning, assisted by F. H. Allhands. Dr. Harvey, who has been on the teaching staff of the Food Industries Department, is being transferred to Astoria and will have charge of this laboratory.



E. W. Harvey, who recently has been placed in charge of the Oregon Food Industries Laboratory.

# Brief Summaries Of AMS Standards For Canned Foods

**For the convenience of those who control quality in the food industries, the following digests have been prepared of the standards issued by the Agricultural Marketing Service.**

ABSTRACTS containing the principal requirements of the standards issued by the Agricultural Marketing Service of the U. S. Department of Agriculture are prepared by FOOD INDUSTRIES. Those published in the August issue and those that follow continue the series started last year.

The complete text of the standards can be obtained from the AMS, located in Washington, D. C.

## Canned Fruit Cocktail

(Tentative)

Canned fruit cocktail consists of a combination of ripened and properly prepared pears, peaches, seedless grapes, pineapple and natural or maraschino-type cherries in proportions as indicated below, packed in sugar sirup, sweetened or unsweetened fruit juice, or water, and is sufficiently processed by heat to assure preservation of the product in hermetically sealed containers.

U. S. GRADE A or U. S. FANCY canned fruit cocktail consists of fruits of good color, practically free from staining from the artificial dye when maraschino type cherries are present, and is surrounded by practically clear packing medium. The units of each fruit are practically uniform in size; are practically free from defects; are firm and tender, and of good texture; possess a normal flavor; and score not less than 85 points when scored according to the scoring system outlined in the standard.

U. S. GRADE B or U. S. CHOICE canned fruit cocktail consists of fruits of fairly good color for each variety, practically free from staining from the artificial dye when maraschino type cherries are present, and is surrounded by reasonably clear packing medium. The units of each fruit are reasonably uniform in size; are fairly free from defects; are reasonably firm and tender and of reasonably good texture; possess a normal flavor; and score not less than 70 points.

OFF-GRADE canned fruit cocktail is fruit cocktail which fails to meet the requirements of the foregoing grades or which falls into the lowest subdivision in any one of the scoring factors.

Canned fruit cocktail shall contain fruits in the following proportions, the figures representing minimum and maximum percentages by weight:

Peaches, diced into approximate cubes, 30 to 50 percent; pears, diced into approximate cubes, 25 to 45 percent; pineapple, cut into segments 5/16 to ½ in. thick and ¾ to 1¼ in. long, or into approximate ½-in. cubes, 6 to 16 percent; seedless grapes, whole, 6 to 20 percent; and maraschino-type or natural cherries, halves, 2 to 6 percent.

Canned fruit cocktail is usually packed in sugar sirup. Sirup "cut-out" requirements, however, are not incorporated in the grades of the finished product, as sirup as such is not a factor of grade for the purpose of these grades.

Canned fruit cocktail will be certified as to grade without regard to sirup density, but in each instance official certificates of grade will bear a notation in connection with the grade statement indicating the density of sirup found upon examination. For this purpose, "extra heavy sirup" means that the sirup tests 22 deg. or over Brix, "heavy sirup" means that the sirup tests 18 to 22 deg. Brix, "medium sirup" means that the sirup tests 14 to 18 deg. Brix, and "water pack" means that the packing medium tests less than 14 deg. Brix.

The maximum head space and the minimum drained-weight allowable in the cans commonly used in packing canned fruit cocktail are shown in a table in the standard. For can sizes not mentioned the minimum drained weight is calculated as 65 percent of the can in water at 68 deg. F.

The grade of canned fruit cocktail may be ascertained by considering, in addition to the foregoing requirements, the following factors: Clearness of sirup (20 points), color (20 points), uniformity of size (20 points), absence of defects (20 points) and character of fruit (20 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

Under the factor ABSENCE OF DEFECTS, consideration is given to the character of workmanship and the presence of such defects as seed cell, peel calyx, spotted or discolored areas in the units of pears or peaches; spotted, discolored, broken or crushed grapes, and grapes with cap stem attached; crushed or spotted cherries; and pathological, mechanical or insect damage in any of the fruits.

A sample score sheet is included with this standard.

ISSUED: Jan. 25, 1941.
EFFECTIVE: Feb. 1, 1941.

## Canned Ripe Olives

(Tentative)

Canned ripe olives are prepared from properly matured olives which have first been properly treated to remove the characteristic bitterness, packed in a solution of sodium chloride, and sufficiently processed by heat to assure preservation of the product in hermetically sealed containers. There are two types of canned ripe olives: (1) Ripe olives—uniform dark color, and (2) Green-ripe olives—yellowish green to light brown color, frequently mottled.

U. S. GRADE A or U. S. FANCY canned ripe olives are ripe olives of similar varietal characteristics; are practically uniform in color, size and symmetry; are practically free from defects; possess a firm but tender fleshy texture; possess a normal flavor; and score not less than 85 points when scored according to the scoring system outlined in the standard.

U. S. GRADE B or U. S. CHOICE canned ripe olives are ripe olives of similar varietal characteristics; are reasonably uniform in color, size and symmetry; are reasonably free from defects; possess a firm and reasonably tender texture; possess a normal flavor; and score not less than 70 points.

U. S. GRADE C or U. S. STANDARD canned ripe olives are ripe olives of similar varietal characteristics; are fairly uniform in color, size and symmetry; are fairly free from defects; possess a fairly firm and tender texture; possess a normal flavor; and score not less than 60 points.

OFF-GRADE canned ripe olives are ripe olives which fail to meet the requirements of the foregoing grades.

The average count or count range per pound of the various sizes of ripe olives is shown in a table in the standard. The range is from 140 for size No. 1 (small select standard) to 32 for size No. 9 (super colossal). Certificates of grade shall indicate the size of the olives found upon examination.

The grade of canned ripe olives may be ascertained by considering, in addition to the foregoing requirements, the following factors: Color (15 points), uniformity of size (10 points), uniformity of symmetry (10 points), absence of defects (10 points), character of fruit (25 points) and flavor (30 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

The COLOR rating shall be determined immediately after the can has been opened. The determination of the color rating of ripe olives shall be based upon the shade of color of the olives, which rating may be penalized for lack of uniformity. All colors are determined by spinning combinations of the following Munsell color discs: Black (N/1 Glossy), Red (5R 4/14) and Yellow (2.5Y 8/12). Olives which show light meat under the skin are entitled to a higher rating than olives showing dark meat under the skin.

Green-ripe olives should possess a generally yellowish-green color which may become less pronounced, and frequently possess a brownish or mottled appearance. The score for color of green-ripe olives is based upon uniformity rather than upon any color designation. The olives may be green, yellowish-green, or light brownish, or may be mottled.

Under the factor of UNIFORMITY OF SIZE consideration is given to the uniformity of diameter of the olives within any size classification.

In considering UNIFORMITY OF SYMMETRY, recognition should be given to characteristic variations of length in different varieties of olives that are of similar diameter. This variation in length affects the uniformity of symmetry and is to be taken into consideration in the rating.

The factor ABSENCE OF DEFECTS has reference to such defects as bruises, skin checks, tree shrivel, salt wrinkle, internal gas pockets, blemishes of all kinds, stems, and damage caused by mechanical or other means. By the word "stem" is meant a stem that extends more than 1/16 in. beyond the shoulder of the olive at the stem end.

Under the factor of CHARACTER OF FRUIT consideration is given to the natural characteristics for the variety as to firmness, tenderness and tendency of the flesh to separate readily from the pits. Under the factor of FLAVOR, consideration is given to the normal flavor for the variety.

A sample score sheet is included as part of this standard.

ISSUED: Feb. 6, 1941.
EFFECTIVE: March 1, 1941.

## Canned Mushrooms

(Final)

The standard of identity for canned mushrooms promulgated under Sec. 401 of the Federal Food, Drug, and Cosmetic Act of June 25, 1938, is hereby adopted for the purpose of these grades.

Styles of canned mushrooms may be whole (whole mushrooms with any part or all of the veils open), button (whole mushrooms with veils completely closed), sliced (mushrooms sliced parallel to the axis of the mushroom into slices of uniform thickness, approximately 3/16 in.) or stems and pieces (cut or broken portions of stems and caps).

U. S. GRADE A or U. S. FANCY canned mushrooms are mushrooms of similar varietal characteristics; are practically uniform in color, size, and symmetry; are practically free from defects; are tender and intact; possess a normal mushroom flavor; and score not less than 85 points when scored according to the scoring system outlined herein.

U. S. GRADE C or U. S. STANDARD canned mushrooms are mushrooms of similar varietal characteristics; are reasonably uniform in color, size and symmetry; are fairly free from defects; are fairly tender and intact; possess a normal mushroom flavor; and score not less than 70 points.

OFF-GRADE canned mushrooms are mushrooms which fail to meet the requirements of U. S. GRADE C or U. S. STANDARD.

Sizes of canned whole or button mushrooms are as follows: No. 0 (Midget) mushrooms will pass through a round opening $\frac{1}{2}$ in. in diameter; No. 1 (Tiny) mushrooms will pass through a round opening $\frac{5}{8}$ in. in diameter but will not pass through a round opening $\frac{1}{2}$ in. in diameter; No. 2 (Small) through $\frac{7}{8}$ in. but not through $\frac{5}{8}$ in.; No. 3 (Medium) through 1-$\frac{1}{8}$ in. but not through $\frac{7}{8}$ in.; No. 4 (Large) through 1-$\frac{3}{8}$ in. but not through 1-$\frac{1}{8}$ in.; No. 5 (Extra Large) mushrooms are those too large to pass through a round opening 1-$\frac{3}{8}$ in. in diameter. Certificates of grade covering canned mushrooms shall indicate the size or combination of sizes found upon examination.

The minimum drained weights for cans commonly used in packing canned mushrooms are shown in a table in the standards. Drained weight must equal or exceed 1 oz. for each 3 cu. in. inside capacity of the container

The grade of canned mushrooms may be ascertained by considering, in addition to the foregoing requirements, the following factors: color (30 points), uniformity of size and symmetry (25 points), absence of defects (25 points) and tenderness (20 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

The typical colors of unbleached white and cream varieties range from Plate 10, F-2, to Plate 11, I-5, of Maerz and Paul's "Dictionary of Color," and for the brown variety range from Plate 11, J-6, to Plate 13, K-7. If the color of the mushrooms is lacking in uniformity or is slightly dull, the mushrooms shall not be graded above U. S. GRADE C or U. S. STANDARD. If the color is unnatural for the variety, excessively white or excessively dark, or if the gills are darker than Plate 14, K-8, of Maerz and Paul's "Dictionary of Color," the mushrooms shall not be graded above OFF-GRADE.

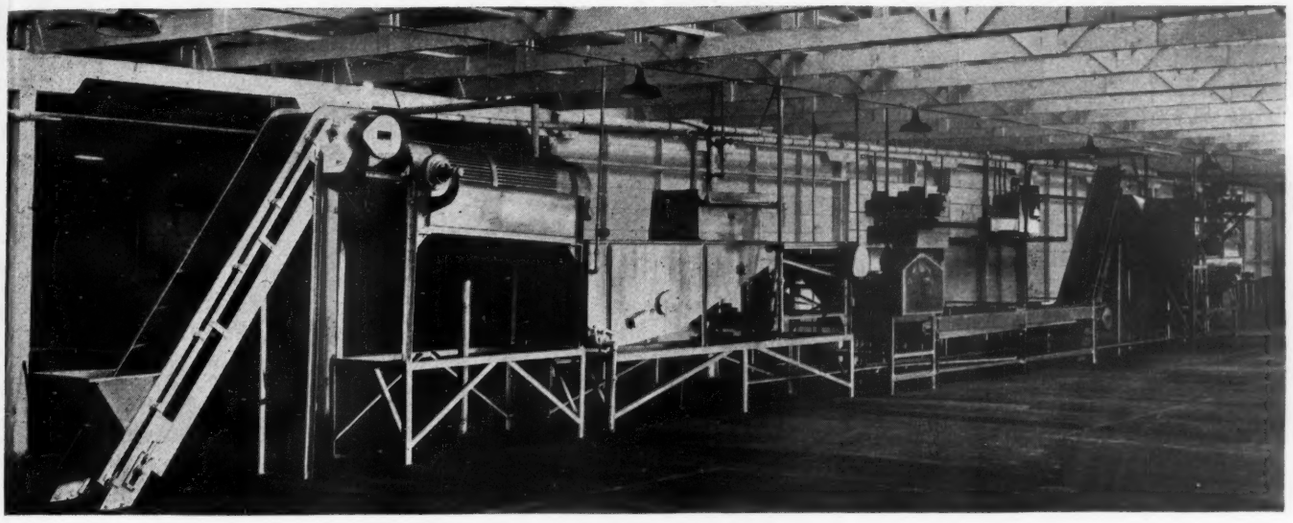
"Defective mushrooms" are whole mushrooms or pieces of mushrooms damaged by discoloration or by insect, pathological, or mechanical injury which materially affects the appearance of the mushroom. Knife marks resulting from the preparation of sliced mushrooms are not mechanical injury.

As used in these grades: "Diameter of the cap" means the greatest dimension of the cap, measured at right angles to the stem; "veils" means the membranes which extend from the inner edge of the cap to the stem and cover the gills; "length of slice" means the greatest dimension across the cut surface of the slice at right angles to the stem; "gills' means the gill shaped plates on the underside of the cap; "damage by discoloration" means any discolored area which exceeds in the aggregate the area of a circle 3/16 in. in diameter; "normal flavor" means that the product is free from objectionable or off flavors of all kinds.

ISSUED: April 23, 1941.
EFFECTIVE: May 15, 1941.

# PRODUCTION

New knowledge may revive the dehydration industry • Jelly made without boiling



Line of new equipment going into new production plant at San Jose, Calif., involves elevator, washer, cleaner, peeler, inspection table, blancher and tray loader.

# Dehydration Looks Up; Pilot Plant Reveals New Information

By L. V. BURTON, Editor, *"Food Industries"*

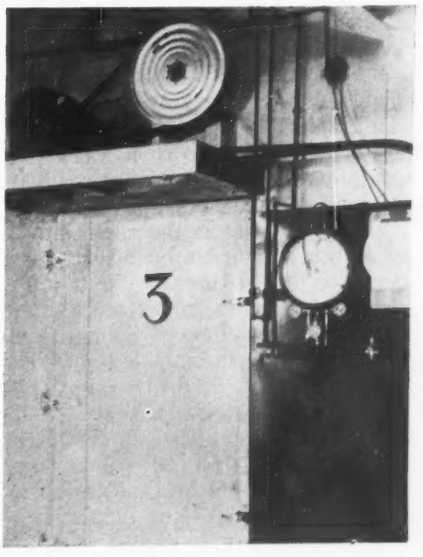
**One of the oldest methods of food preservation—dehydration—appears due for an important revival. By borrowing the knowledge of quality control gained in the past decade by quick freezers, a dehydrator has overcome problems that licked many a concern in the past. And it looks as if he were going to town in a big way. Tests by Army show that many dehydrated vegetables are acceptable.**

MORE failures, both business and technical, have been chalked up in the past against dehydration as a method of preservation of vegetables than against any other attempt by man to preserve his foods between harvests. Dehydration has been successful for almost everything but vegetables. It is doubtful if there is any record of the origin of dried fruits, the art is so old. Dried figs, dates, peaches, raisins, prunes, apricots and apples, dried salted cod fish and jerked meat all date from antiquity. Then why is it that vegetable dehydration has never been successful in the past?

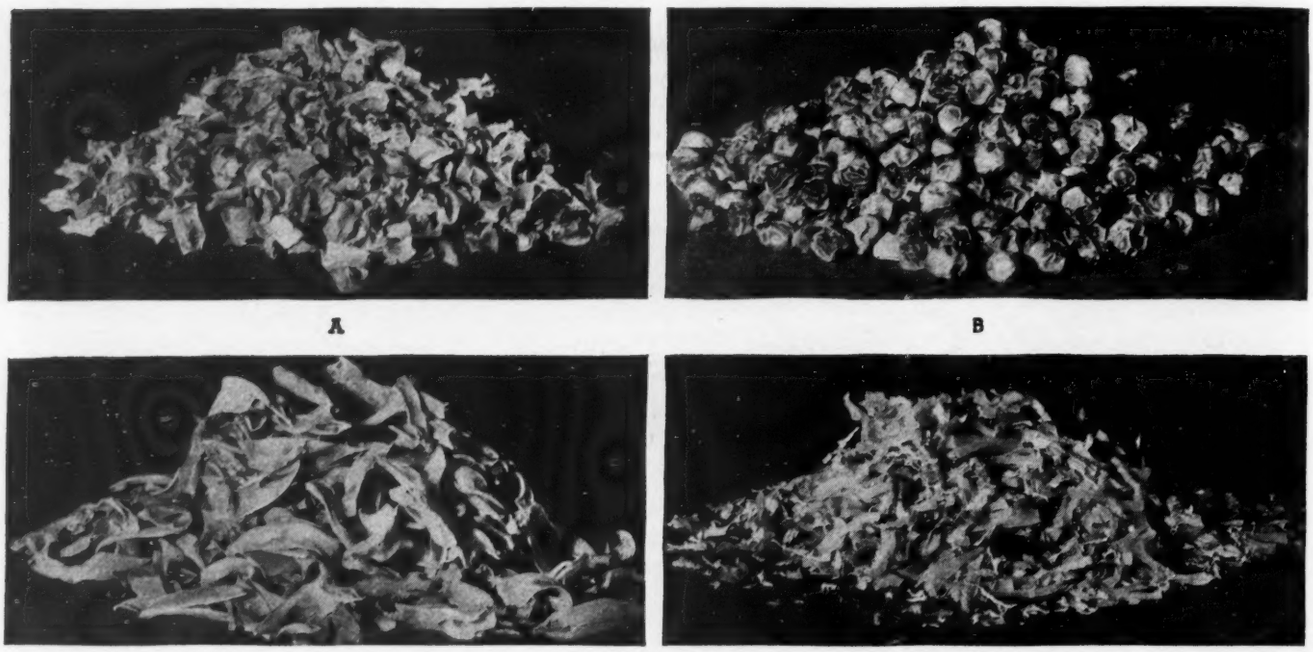
Any number of attempts were made in 1916-19 to establish dehydrating companies with vegetables as the raw material. Along about 1925, the owner of one of those lamented efforts was asked what had become of his dehydrated vegetable business.

"It burned down, thank God!" was his very illuminating answer.

In the light of today's knowledge of food technology many of the reasons for past failures can be explained. But it has taken the past ten years' experience of the quick freezing industry to develop some of the needed informa-



The tray dryers, built to the company's own design, were equipped with automatic temperature and relative humidity recording controllers.



A B C D

Some of the products produced in the pilot plant: *A*, carrots; *B*, peas; *C*, wax beans; *D*, dry soup mix.

tion. And, had it not been for the freezing experience, it is doubtful if the basic knowledge would exist today on which successful vegetable dehydration is going ahead.

Those who have closely followed the history of quick freezing recall the case of about eight carloads of frozen peas that had to be destroyed because their flavor resembled moldy hay. Research discovered that the enzymes in the vegetables had not been inactivated prior to freezing and had kept on functioning, even though the peas were frozen hard, ruining the flavor of the peas. It is now known that enzyme control in freezing is indispensable. And if the enzymes are not inactivated by suitable heat treatment (blanching) prior to freezing, a frozen vegetable kept at a temperature of 0 deg. F. or higher may go so far off-quality that you can't even give the stuff away.

Where freezing is the preservative, either the food must be blanched to inactivate the enzymes or else it must be stored at temperatures lower than —10 deg. F. Failure to do either of these means a merchantable life of less than six months. And that is not long enough for commercial success. And, furthermore, proper enzyme control in frozen foods is generally more economically obtained by heat treatment than by excessively low temperatures.

### *Dehydration Borrows From Freezing*

What has all this to do with dehydration? Only this: Dehydrated vegetables seem to suffer comparable enzymic deterioration, and, until dehydrators became aware of this fact and instituted enzyme control, many of their products made from vegetables enjoyed very little public acceptance. In the past, the lack of palatability of dehydrated vegetables and the difficulty of bringing them back to moist condition by soaking were characteristic problems. The latter problem of "case-hardening" was solved by high-humidity drying, but until the vegetable freezers solved their own peculiar problem of flavor-loss, no noteworthy progress was made in vegetable dehydration, except for garlic and onions, which somehow seem to have escaped the difficulties that beset the other vegetables.

Among the older methods of dehydration is the D'Andrea process, of which very little had been heard until recently. During the first World War this process, which was developed by Mrs. A. Louise D'Andrea and her brother, Dr. George A. Sykes, was actively promoted. Then it passed into obscurity until 1938, when Dry-Pack Corp. was organized and took over the entire process and patents. The new company applied the latest knowledge of engineering and food technology, built a pilot plant at Sodus, N. Y., in the vegetable and fruit growing area, and, backed by ample capital, began to produce on a small commercial scale both dehydrated fruits and vegetables.

A pilot-plant operation, of which there are entirely too few in the food industry, is for the purpose of determining costs and engineering data and producing a sufficient quantity of finished goods to test the market reaction. Properly conducted, a pilot plant has for its basic concept the idea of keeping mistakes small so that profits may be large.

### *Results Obtained*

Not only has the new company been successful in producing acceptable dehydrated vegetables, it has made the following discovery which is highly significant: It can make a reasonable profit while at the same time underselling either canned or frozen vegetables.

If the future experience of this company duplicates the experience of the past two years of pilot-plant operations, then the canning and freezing industries face new competition. This new competition may or may not be formidable, depending on how the future works out, for, just as freezing is more economic when it is an adjunct of a canning operation, dehydration may turn out to be another adjunct of canning.

Apparently two courses are open in the future: (1) Dehydration may become a department of an established canning enterprise. (2) Dehydration may become an independent enterprise in direct competition for raw materials and markets.

Just why these two alternatives appear to be the most probable in the future is apparent from a review of the technical methods employed and the degree of cooperation that has already

been worked out by Dry-Pack Corp. with some of its sources of supply.

The pilot plant was located on a piece of land that adjoins an established canning concern at Sodus. Steam was purchased from the cannery, for unless the cannery also had raw materials to work on there was nothing to dehydrate. So the same boiler plant served both concerns with no additional problems except for the purchase of coal.

Raw materials were originally purchased from canning companies within a radius of 50 to 60 miles, until the required volume became too great. Most of the work of preparing the raw material for dehydrating had been done by the canner. All the dehydrator needs to do is wash, cut or blanch the vegetables, then dehydrate and package them.

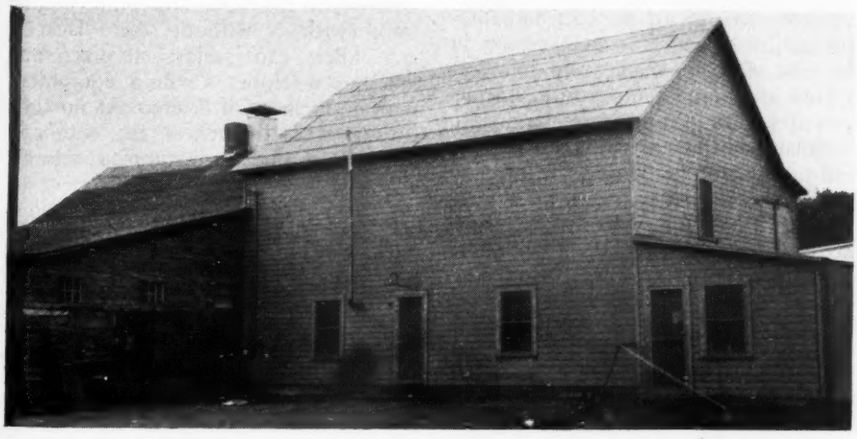
Because this pilot plant did almost nothing but dehydrate, the volume of material put through was much larger than would have been expected from so small a plant. Actual operating data show that between 20,000 and 25,000 lb. of prepared raw material can be dried per 24 hours on the three dehydrating units that were on test for two years.

Yields obtained from the input are, of course, dependent upon the original moisture content of the material and upon the final moisture content desired. In general, moisture removal is carried to a point where the product will be in equilibrium with the atmosphere. There are some products, such as apples and strawberries, that may be hygroscopic when properly dehydrated, a property that must be compensated by moisture-tight packaging. But vegetables are very simple.

Each of these dryers was designed specially by Dry-Pack Corp. Essentially, the procedure is a tray-drying operation, with very accurate automatic control of humidity, temperature, rate of air movement, amount of recirculation of air and time of the cycle.

In general, the drying cycle is 3½ hours, which with time out for loading and unloading the trays, permits six cycles per 24 hours. In the case of apples, 35,000 lb. of steam is needed to produce 3,000 lb. of dried apples. This production is equivalent to 13 percent of the original put-in weight. For other products such as peas, lima beans, corn, onions, etc., the figures are roughly comparable.

The pilot plant needed only three men to operate it on an 18-hour day.



In this small pilot plant, which adjoined a vegetable canning factory, Dry-Pack Corp. worked out its production problems by producing nearly 500,000 lb. of dehydrated vegetables per year for two years.

### *Formula for Dehydration*

Though some may smile at the thought of a formula for dehydration, since the process represents merely moisture removal, there actually is something of a formula involved. For every different product there is a correct method or schedule of drying, stated in temperature, relative humidity, rate of air motion and the necessary changes in these figures at stated periods in the drying cycle. These data, schedule or formula, plus the automatic control of all the operations and conditions, are the heart of the whole process (and are not divulged to outsiders).

Automatic controls are essentially recording psychrometers equipped with a dual control system. Two pens record the temperature in the dryer, as measured by a wet bulb and a dry bulb, the difference between these temperatures being read as a measurement of the relative humidity.

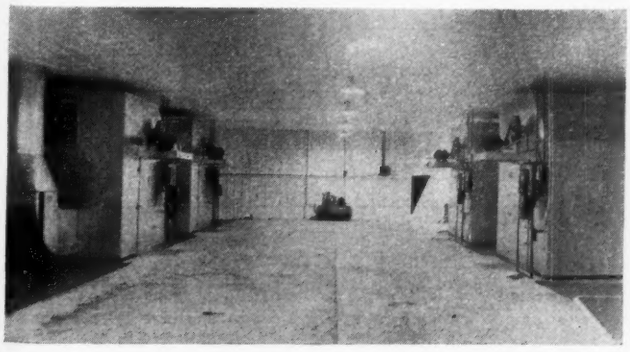
These two control systems operate their respective valves and dampers to keep the temperature and humidity in the dryer at the desired balance, throughout the scheduled period. As processing advances from one stage of the drying schedule to the next, the two control pointers are reset at proper points on the chart, and the control systems hold the corresponding conditions until the settings are again changed.

Because of the variety of products undergoing dehydration in this pilot plant, each product having its own appropriate schedule, the successive scheduled steps were established by manual setting. If, however, the same process cycle were to be repeated over and over on the same raw material, the entire dehydration schedule or "formula" could be automatically controlled by a time and sequence controller.

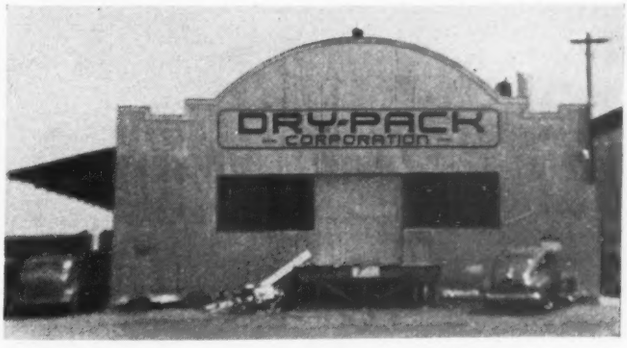
### *Commercial Success*

In addition to affording a chance to ascertain operating costs and to locate

*(Turn to page 96)*



Interior of drying department, with four units visible.




New plant under construction in California.

# Research on Hydrolysis Simplifies Manufacture

By GEORGE L. BAKER and M. W. GOODWIN*
Delaware Agricultural Experiment Station, Newark, Del.

**Cranberry jelly can be made without boiling as a result of thorough investigation of what actually occurs in making this jelly.**

PRODUCTION of a cold jelly by mixing pectin, acid and sugar sirup is a common laboratory experiment to demonstrate the value of each of these ingredients in jelly formation. While this calls for careful manipulation in the case of the 65 percent sugar jelly, it is a simple procedure in the making of cranberry jelly. The requirements are merely a mixture of 39 parts sugar with 61 parts of a viscous cranberry extract. The strength of the jelly will depend upon the pectic value (viscosity)[2] of the cranberry extract.

The cold cranberry jelly made up in conjunction with the experiments reported in the August issue of FOOD INDUSTRIES[1] suggested a simple method of making cranberry jelly which removes the necessity of evaporating water from sugar-pulp mixtures. A brief outline of the method is as follows:

Heat cranberries with water in a manner sufficient to produce a pulp (puree), a sample extract of which has a capillary viscosity of at least 30 (Ostwald 80 deg. F.). This sample extract is expressed from the pulp by squeezing through two layers of silk and then straining the resulting juice. A definite standard viscosity based on the strength of the jelly required will result in a uniform final product.[2]

Take 61 parts of the pulped extract (puree) and 39 parts of cane sugar and mix without further heating until the sugar is thoroughly dissolved. Two minutes mixing time is generally sufficient for complete solution. The resulting mixture may be filled directly into cans, sealed and heated sufficiently to pasteurize the product. The set will be sufficiently slow to allow time to utilize the simplest of processing machinery either as a batch or a continuous operation.

### *Laboratory Trials*

Trials of this low-temperature canning process were made successfully with two pulps. One of these had been extracted for 6 minutes at boiling temperature (viscosity = 50.6), and the other had been extracted for 30 minutes at 180 deg. F. (viscosity = 44). The 39 to 61 ratio of pulp to sugar was taken and the mixture poured into jars at 125, 145, 165, 185 and 205 deg. F.; also after the mixture had just boiled. After sealing, the product was held at pouring temperature for 15 minutes.

Upon opening the jars after 24 hours it was noted that, whereas the lower temperature of extraction produced a somewhat lighter colored product, the tendency toward air bubbles and filming on the surface was greater than in the case of jellies made from pulp extracted at boiling temperature. Extraction at boiling temperatures tended to coagulate substances which aid in supporting the surface films. The pulping operation removes or breaks up a large portion of the film when it is coagulated. It appears from the preliminary experiments that filming will not be a serious factor in such a method of cranberry sauce manufacture.

After 24 hours very little difference in strength could be noted in those jellies poured at a temperature above 185 deg. F., while the strengths of those poured at lower temperatures were proportionally lower. The full strength of the jellies prepared by this method cannot be expected to develop in less than a week's time. After sufficient aging, jellies poured at the lower temperatures will eventually attain or surpass the strength of jellies poured at the higher temperatures.

Sterilization of the canned product was considered satisfactory above 165 deg. F. Longer holding at the 145 deg. F. temperature would accomplish the same result. In practice, cans may be filled with the pulp-sugar mix at low temperatures, sealed and then sterilized at a higher temperature (165 to 185 deg. F.) without fear of injuring the strength or syneresis values of the final product. Soluble solids content of the finished product is thus constant and may be easily controlled.

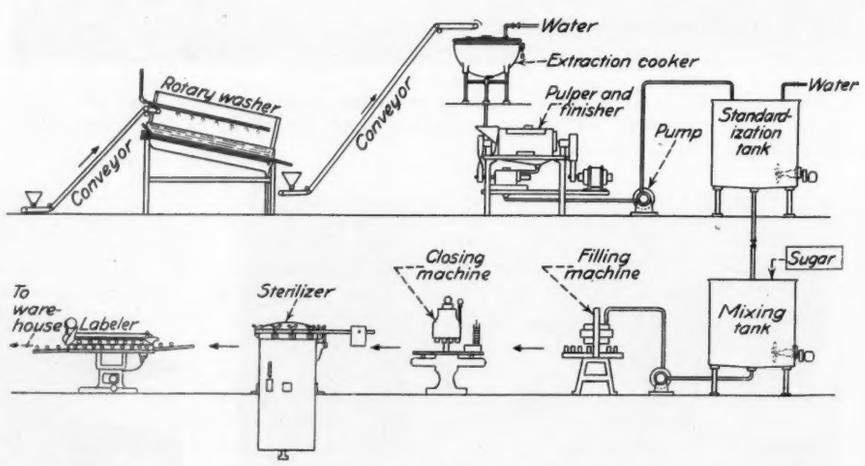
### *Equipment*

Equipment for the direct canning process for cranberry sauce may be limited to a berry washer, extraction cooker, pulper, storage and standardization tank, automatic proportioning equipment for sugar and pulp, mixing tank (with or without steam jacket), can filler, can sealer, sterilizer and labeling machine. Cooling equipment may be included if desired. At no time during such a process for cranberry sauce is a boiling temperature absolutely required.

### *Conclusion*

It has been found that the direct low-temperature canning of sugar-cranberry pulp mixtures followed by sterili-

(Turn to page 94)




**Flow sheet for manufacture of cranberry jelly by low-temperature method. Amount of water added in extraction cooker should be such as to bring approximate relative viscosity of filtered sample of pulp from finisher to about 50. Water is added at standardization tank if necessary to bring viscosity into the 40 to 60 range.**

* Published with the approval of George L. Schuster, Director, Delaware Agricultural Experiment Station.

# Overhead Ice Bunkers Using Ice Ribbons Give Trucking Economy

By ARTHUR ADAMS
FlakIce Corp. of N. Y., Brooklyn, N. Y.

**Developed to provide a means of refrigerated transport for milk in paper containers, with which ice directly on the containers cannot be used, this method provides a satisfactory way to convert any insulated truck body into an effective refrigerated carrier.**

OVERHEAD bunkers using FlakIce "Frozen Water Ribbons" and ice water as the refrigerant are now in successful operation for the refrigeration of large truck bodies in the transport of milk products in paper containers. Two separate fleets of trucks have been equipped with FlakIce Overhead Bunkers (patents pending) for the purpose.

The general design and form of construction of a bunker unit consists of a pair of right-hand and left-hand overhead bunkers. The floors of the bunker unit form, in effect, a continuous arch between the side walls of the truck body, the walls serving as abutments for the arch. Small steel blocks, placed between the two separate bunkers comprising a bunker unit, serve as "keystones" to hold them in place, thus providing means for the transmission of load stresses along the arch to the abutments. The side wall on the long side of each bunker is made of a single steel plate bent and extended so as to serve both as a seat for the end of the corrugated steel arch and as a flange which is bolted to the side wall of the truck body as an arch anchor.

The bunker itself is made up of sheet steel top and sides, a corrugated sheet steel floor and steel angle connections. The corrugations, lying along the perimeter of the arc, add strength to the structure. All joints are welded watertight. The bunker is finally galvanized all over, inside and out.

The general dimensions of the truck body and bunkers being described are: Truck body, 17 ft. 9 in. long by 7 ft. 3½ in. wide by 6 ft. high at center and 5 ft. 10 in. high at sides, inside dimensions; each bunker, inside, 82 in. long by 41¼ in. wide by 1¾ in. deep at center and 10 in. deep at side to bottom of corrugations.

Advantages are obtained by dividing the bunker unit into right-hand and left-hand bunkers. Either bunker, in the case of an existing fleet of trucks, can be passed through any ordinary door of the truck body without any trouble or special provisions, and can be put in place simply by means of a few bolts and nuts.

### *Bunker Drainage*

Each bunker unit is equipped with a drainage system, consisting of 1-in. galvanized pipe with fittings. An overflow pipe with strainer in each bunker is connected to the outlet line by a swivel joint which permits the opening to be set at a given point corresponding to the desired water level. The outlet line is carried to a locked control valve located below one corner of the truck body. Drainage of the ice meltage water takes place only at times of re-icing the bunkers.

The FlakIce refrigerant is loaded into the bunkers through hatch openings in the roof of the truck body. There are four such openings in the truck body being described.

Each of these bunkers weighs 200 lb., so that the total weight of overhead bunkers per truck body is approximately 800 lb. Weights are less for smaller truck bodies and bunkers to suit. The maximum ice load, seldom if ever required in this fleet of trucks, is 300 lb. per bunker. That is, the total maximum weight of bunkers and ice is one ton in the described trailer truck. The weight of the net load carried by this truck is approximately 14

**Here is one of the trailer trucks used for hauling milk in paper containers and refrigerated by means of FlakIce "Frozen Water Ribbons" and ice water, held in four overhead bunkers that are served through the four hatches shown on the trailer roof.**

tons for an all paper packaged load and 10 tons for an all glass bottle and crate load in which no ice is used in crates, as being unnecessary during transport.

The interior of the truck body is equipped with standard floor racks and with special wall slats. Load packages are placed against the slats and thus form air spaces ½ in. deep between wall and load.

### *Refrigeration Results*

In accordance with usual practice, the milk loaded into these trailer trucks has a temperature of 40 deg. F., within a few degrees either way. In respect to higher outside temperatures, this is a "cold load." During the running of preliminary tests of the bunker installation, several packages of milk at varying temperatures up to 60 deg. F. were included in the load, as will be referred to below.

The theory of this refrigerating method is that heat leakage through the walls of the truck body warms the air in the wall-slat air spaces and (in the case of a "cold load") the lightened air rises to the ice bunkers and passes toward the center of the truck along the corrugated surfaces of the bunkers where the excess heat is removed from the current of air. The cold air, having become relatively heavy, drops through the load to the floor and thence flows through the floor-rack spaces back to the walls, picking up heat leakage through the floor enroute. Heat leakage through the roof is intercepted by the ice bunkers.

By this method of refrigeration, heat leakage into the truck body is absorbed by the ice in the bunkers before the heat can reach the load. Milk loaded into the truck at 38 deg. is unloaded 10 or 12 hours later at the same or lower temperature.

Warmer milk, such as the test lot at 60 deg. F., comes out with substantially reduced temperatures. Packages of cold milk placed against the walls do not acquire a temperature appreciably higher than when loaded. Cold milk in the aisle between the side doors retains its original loading temperature; wall slats on the side doors provide means for the usual upward air current which arrives in due course to transfer the heat leakage through the door insulation to one or the other of the two bunkers adjoining the aisle.

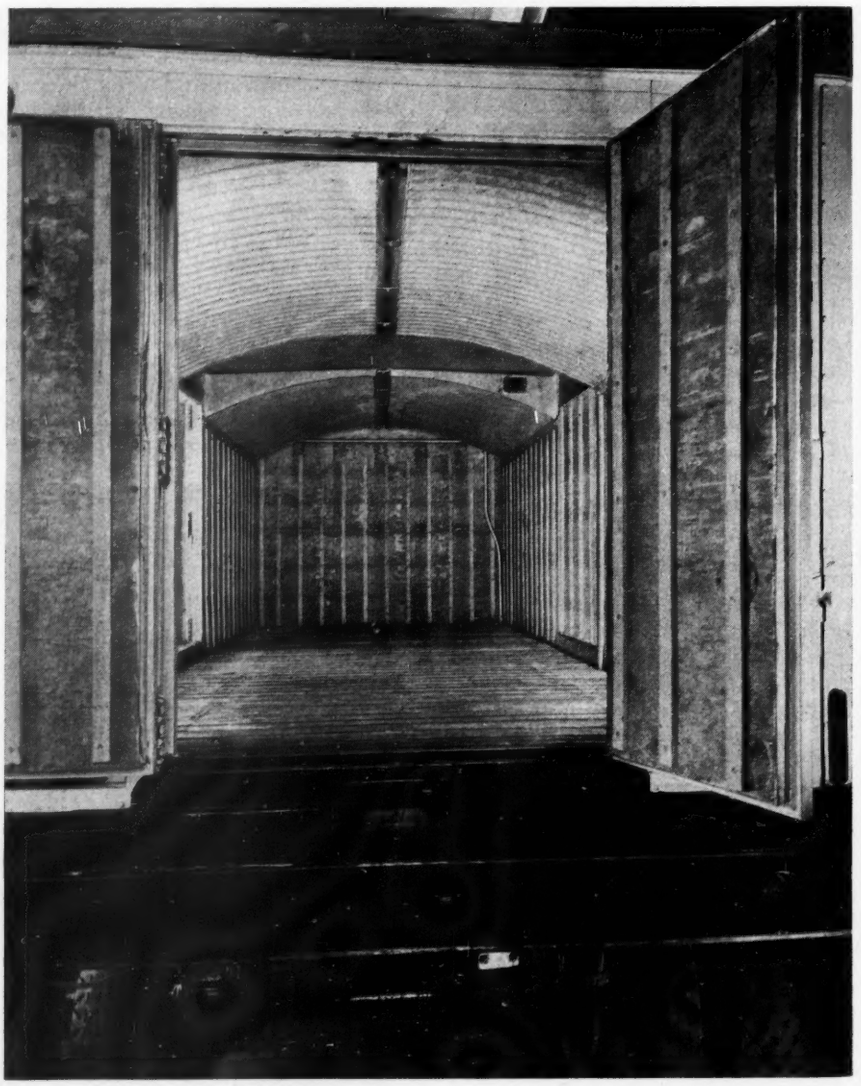
This fleet of trucks is operated for the purpose of transporting milk in paper packages from main pasteurizing plants to substations where it is transferred, or unloaded into retail route trucks and wagons. The loading and unloading period may extend over 4 to 8 hours and the side doors are then open. The milk in the aisle between the side doors is the first to be unloaded so that its temperature does not rise before being transferred. The heat-laden air entering the truck body through the open doors is relatively light, so it rises and moves into the refrigerating surface area of the bunkers where the door heat is absorbed. Some cold air is lost through the open doors, but this means simply that the rate of ice consumption increases during the open-door period. This favorable condition during the unloading period is helped to a considerable extent by leaving the wall stacks in place until the last so as to maintain better the natural air circulation up the side walls to the bunkers.

The refrigerating results obtained in these trucks were consistent throughout the period covering the latter part of the summer of 1939, the summer of 1940 and the early summer season this year. Whether the outside temperature was 60 deg. F. or approaching 100 deg. F., the milk always came out at the same temperature as when it went in or at a lower one.

The writer is advised that during these summer seasons not a single complaint in regard to the temperature of the milk refrigerated by the overhead bunkers in the fleet of trucks was received from any interested party who handled the product or who was in any way responsible for the delivery of cold milk in paper packages to truck destinations at transfer points.

### *Air Circulation*

The direction of the natural air circulation created by the overhead bunkers



**Interior view of one of the trailers through the opened rear doors. This shows clearly the design of the four bunkers and the method of holding them in place. Note that between the forward and rear bunker units, each made up of a pair of bunkers, space is left where the side doors of the truck open.**

With a hatch cover removed, the inside of one of the bunkers can be seen, filled with a mixture of ice water and FlakIce ribbons.

as above described is due to the presence of the "cold load"; with the presence of a "hot load" if sufficiently warm, in the same truck the direction of the air circulation is reversed. Heat emanating from the hot load imparts to the circumambient air a rising force of buoyancy sufficient to compel the air leaving the bunkers to flow toward and down the side walls of the truck body. Although the air while moving down the walls (and centerward across the floor) picks up heat leakage en route, its temperature, assuming suitable insulation, is yet low enough to afford a continuous absorption of heat from the hot load as it moves upward from the floor through the load to the bunkers. The refrigerating value to be obtained from this fact depends upon such factors as temperature of load desired upon arrival at destination, rappidity required in lowering temperature of the load during transport, precooling load products to some extent, auxiliary transport conditions such as re-icing facilities and mixed-product loads.

### *Re-icing Hot Loads*

In the case of "hot loads" in transport the question of re-icing facilities becomes important because it is obvious that the rate of ice consumption is then much greater than it is in the case of "cold loads."

Water from ice meltage remains in the bunkers during the refrigerating period which, in the fleet of trucks being described, includes the loading time, the transport to substations, unloading time and return to main plant. At time of re-icing the bunkers after return to the main plant, water is removed in an amount corresponding to the ice put in. That is, the water is drained down to a predetermined minimum level, which is accomplished by setting the swivel outlet pipe, above described, to suit such level.

So long as any appreciable quantity of ice, down to a few percent of the original quantity, remains floating in the water, the liquid in the bunkers is ice water. It covers 100 percent of the floors and refrigerating surfaces of the bunkers. During transport and during much of the standing time, the temperature of all of the ice water is 32 deg. F. During the balance of the standing time, the water in the vicinity of the peak of the arch may reach a temperature of 35 to 40 deg. F. That is, for most of the refrigerating period, 100 percent of the refrigerating surface is held at 32 deg. F. and for a part of the time (while standing) 20 to 25 percent is held at approximately 35 deg. and 75 percent to 80 percent at 32 deg. F.

### *Ice Consumption*

The average consumption of ice in the overhead bunkers, according to the experience of the fleet owner during the above mentioned summer seasons, was approximately 600 lb. per day of 12 hours operation, or 50 lb. per hour. The total maximum ice capacity of the four bunkers is 1,200 lb. of ice, so that any one of these trucks with full ice load can be expected to operate nearly a full day of 24 hours under the same conditions with same refrigerating results without re-icing. These trucks carry two inches only of insulation. Under transport conditions with all doors continuously closed the operating period without re-icing can be substantially extended, particularly if the truck body be provided with a somewhat heavier insulation, or if the ice-carrying capacity of the bunkers be increased.

A certain amount of condensation forms on the refrigerating surface of the bunkers. During transport of the truck loaded with milk in paper packages the amount of condensation is slight because there is not enough moisture in the truck body with closed doors to be of consequence. With doors open while standing the condensation is heavier. But except for a negligible amount at the top of the arch, this being easily taken care of, all of it flows down along the corrugations to the side walls and thence to the floor. With loads having characteristics other than those of a cold paper-packaged milk load, the condensation may in some cases vary from the one just described. And where important, special provisions can be made in the overhead-bunker installation to meet the situation.

Where the temperatures desired are lower than those obtained from the use of ice and water alone in the bunkers, salt in any desired proportion can be added. Tests in an overhead bunker in a truck compartment have demonstrated that this type of ice bunker affords very effective refrigeration with ice and salt, although it does not, of course, prevent the usual gradual rise of temperature of the mixed solid and liquid refrigerant in the bunker as the salt is converted into a gradually diluted brine. Incidentally, it can be stated, the same tests demonstrated that with a mixture of FlakIce refrigerant and salt, the average air temperature inside the truck compartment was several degrees lower than was obtained with the same mixtures of salt with other types of ice; and the period of gradually rising temperatures was retarded. The reason, apparently, was that the salt attained and retained a more uniform and intimate mix with the FlakIce ribbons than with other types of ice.

### *Low Temperatures*

Where temperatures in the zero field are wanted, the use of FlakIce eutectic salt ice in overhead bunkers is effective and economical, as has been demonstrated by its use in ice cream delivery trucks equipped with overhead bunkers. This refrigerant is put into the bunkers in the presence of, preferably, cold eutectic salt brine which is carried at a predetermined level as is done with ice water. The temperature of the brine, which remains eutectic throughout, is constantly —6 deg. F. so long as an appreciable quantity of eutectic salt ice remains floating in the bunker. The average air temperature in a suitably insulated and operated truck body carrying a "cold load" is maintained with this refrigerant in overhead bunkers in the vicinity of 0 deg. over operating periods of 14 hours or more, without re-icing.

If it is desired to keep the interior of the truck body heated during winter transportation, warm water can be carried in the overhead bunkers, the bottom surfaces of which will then be heating surfaces instead of refrigerating surfaces. The water can be kept warm at suitable temperatures by one or another of several available contrivances, including means for utilizing heat from the truck motor.

Although the foregoing description largely covers the single application of refrigeration of paper-packaged milk by overhead bunkers, there is probably not a single field of truck refrigeration where this method cannot be used to obtain the same or similar advantages of convenience and economy.

# MATERIALS

Reports from the Field on Shortages and Substitutes • Advice on Imitation Flavors

# Shorts on Shortages

**You are not alone in your troubles growing out of the defense program, as the items on this page will testify. And you will find it interesting to see what others are up against. Perhaps you also will get some ideas that will stand you in good stead.**

WITH problems of procurement and discovery of possible substitutes growing more difficult every day, the most common subject of conversation seems to be: "How are you fixed for * * *?" So, while the emergency lasts, FOOD INDUSTRIES will report here from time to time on shortages that exist or may be anticipated.

You are invited to contribute your own ideas or experiences to this department. Simply mail them to the editor.

## Vanilla Beans Coming

BOURBON vanilla beans are, we have been informed, to be imported again in limited quantities. OPACS has completed the intricate arrangements for bringing in about 150 tons of Bourbons to the United States. If the Axis does not sink them en route, they ought to be here by late autumn.

## Paper Box Shortage Acute

IT's a long story to explain why the corrugated and solid fiber box situation is so sold out that one firm employs five girls to answer the phone and explain in as sweet a manner as possible that they are "very sorry, but we can't accept any orders from any but our old contract customers or from companies that have priority ratings. No. We are very sorry we can't help you out. No! It would be impossible to help you out now. We are sold out to June, 1942, with our regular contract customers. I'm so sorry."

Back of the sold-out condition are several factors: (1) Army buying of items in millions of corrugated and fiber containers. (2) Under the lease-lend law Great Britain is to get about 42,000,000 cases of canned foods alone. Both of these are demands above and beyond previous normal requirements. (3) Shortages of chemicals used for the manufacture of paper pulp. (4) Increased demands for paper.

## One Way To Escape Shortages

GOSSIP in the trade has it that one of the soup companies has anticipated a severe shortage of tomatoes for its tomato soup. In 1918 the average price paid for tomatoes on the open market by one company in that area was $43.00 per ton, considerably more than double the normal price of that day. On one day in that year the price went to $90.00 per ton for a few sales. To avoid a repetition of such high raw material wits, the soup company is said to be directing vigorous consumer advertising toward items that do not include tomatoes as an ingredient.

## Farm-Hand Shortage

A STRAW in the wind for those who must contract with farmers for raw materials is the report of four county agents in south New Jersey that there is a combined shortage of 7,000 experienced farm hands in their counties. Most of these hands have gone to more lucrative jobs in munitions plants, which may account for a 5 percent reduction in acreage of one contract crop as compared to 1940.

## Underdrawers vs. Food

NOT long ago, according to a friend in OPACS, the Army requested bids on 350,000 pairs of underdrawers, but the bids were negligible in number. OPACS began an investigation, for the situation looked phoney. And here's how it was: Bone buttons were not available. This was caused by lack of suitable bones. In turn, this was the result of the scarcity of ships, for foreign bones are not being imported.

Domestic bones from packing houses were unobtainable, according to our informant, because gelatine makers were bidding high for them. Glue manufacturers also want these bones and can't afford to pay gelatine prices. Button manufacturers, who are not able to use all sorts of bones, can't get any at all. So OPACS is preparing to step in and order priorities.

From where we sit it appears that button makers will get the first choice of the bones of domestic origin, for an Army without underdrawers that would stay up might be seriously handicapped on the march. Zippers for underwear are likewise out of the question. And chemicals are too scarce to use for making synthetic plastic buttons.

After the bone-button makers take their choice of bones, then the glue makers are to get their needs supplied, and then if there are any bones left the makers of gelatine (ossein type) will have a chance to buy. But price control is expected to preclude any one with lots of money from corraling the supply or getting in out of turn.

## Nuts Are a Problem

NUTS have become a problem to the candy manufacturer. Imported varieties such as almonds, pistacchios and Brazils have been short so long that they have almost been forgotten. Domestic peanuts have been in such demand that the price has gone from $65 to $90 per ton. Operators who have not been able to buy for future requirements are very unhappy about it.

## Shoppers Out in the Cold

PURCHASING agents of companies who shop around for the lowest bidder in ordinary times, and then play one seller against the other, have begun to turn salesmen. Some of them are doing a lot of traveling these days and are spreading their blandishments with a lavish hand. But suppliers are not

falling hard for the new propaganda. A buyer for a big food company recently walked into the office of a sales manager with whom he places an occasional order, gave the sales manager the glad hand and a 26-tooth smile and said:

"You don't know how glad we are that we have been doing business with your company!"

To which the sales manager responded with repressed enthusiasm: "Yes, we are taking good care of all our customers who have *contracted* for *all* their requirements from us."

Supply manufacturers all over the country are finding it difficult to conceal their smiles over the frantic efforts of "shoppers" to find some one who will take care of them.

# Imitation Vanilla Flavors Require Honest Formulation

By H. W. CHENOWETH

Virginia Dare Extract Co., Brooklyn, N. Y.

**Here are presented some of the facts about the proper ingredients to use and how to label imitation vanilla extracts and flavors. Every manufacturer who makes or uses these products should know the facts given by the author, otherwise he may run into trouble.**

THROUGHOUT the country today many food stores are offering for sale 12- and 16-oz. bottles of caramel-colored water. These products, labeled "Imitation Vanilla," contain merely a trace of flavoring material and are sold at ridiculously low prices. The only effect of adding increasing amounts of these so-called flavors to a food product would be to dilute it. This situation constitutes a striking example of mislabeling and adulteration as defined under the Federal Food, Drug and Cosmetic Act. Federal and state officials are continually fighting to rid the market of such fraudulent products, but their job will be a difficult one as long as there are unscrupulous producers and gullible buyers.

There is, however, a very definite place in the field of flavors for a good legitimate imitation vanilla. This was never more true than it is today. The cost of producing pure vanilla extracts has skyrocketed in the past year. War conditions have advanced sharply the price of vanilla beans. Considerable alcohol is required in the manufacture of pure vanilla extract, and thus the raw material cost is greatly affected by the ever increasing Federal tax on alcohol. Quite naturally pure vanilla extracts must be sold at higher and higher prices. Many housewives will refuse to pay these higher prices because they simply cannot afford so great a premium for a pure, natural product. Many commercial users—bakers, ice cream manufacturers and others—cannot use pure vanilla for certain types of products, or in their cheaper lines, because their trade will not accept an increase in the price of the product. A good imitation vanilla, well compounded from proper ingredients, will answer these needs and will be more and more in demand as the price of the genuine extract advances.

There are several important considerations which must be made with regard to this imitation product. In the first place, it must be of such a flavor strength that it will actually accomplish the same results as the natural product. Some years ago government officials determined that a 0.7 percent vanillin solution was identical with pure vanilla extract in strength of flavor but not in quality of flavor. Other investigators, including this writer, have shown that this figure is somewhat low. However, 0.7 percent vanillin solution is recognized by the Federal government and most State officials as being the required amount of flavoring material for a legal single-strength imitation vanilla. The government officials have also ruled that coumarin shall be considered three times as strong in flavor strength as vanillin and that this factor shall be used in calculating the total flavoring strength of a mixture of these two compounds. The flavor of coumarin is somewhat different from that of vanilla, and since many consumers object to the harsh note which it introduces, the flavor manufacturer will do well to utilize this product sparingly.

### *Labeling*

A second point of consideration is the proper labeling of the bottled flavor. Food & Drug Administration officials have attached particular significance to the presence or absence of ethyl alcohol. If the solvent used in the preparation of this imitation vanilla is dilute alcohol, then the product should correctly be designated as an "Extract," *i.e.*, "Imitation Vanilla *Extract*." Should alcohol be removed from the formula and some other solvent be employed, such as glycerine, then this same product can no longer be called an "Extract" but must be labeled "Imitation Vanilla *Flavor*." The law requires, and rightly so, that the word "Imitation" must appear in the same size and boldness of type as the word "Vanilla." A list of ingredients used in the preparation of the product must also be given. This might read as follows: "Prepared from vanillin, caramel, glycerine and water." Many flavor manufacturers add a small percentage of pure vanilla extract to their imitations because they feel that the resulting flavor is smoother and fuller. In this connection, it should be borne in mind that the government officials have stated that if pure vanilla is declared as an ingredient there must be actually present at least 5 percent pure vanilla extract. Such other information as size of package and name and address of

(*Turn to page 96*)

H. W. Chenoweth

# Lend-Lease and Defense Increase Food Demand

By G. L. MONTGOMERY
*"Food Industries"*

**While increasing quantities of food are likely to be shipped to Great Britain and other anti-Axis countries, only certain products will be affected. Supplying this increased demand will put new burdens on food processors and may curtail domestic food supplies.**

NO one can tell exactly what new demands upon American food processors may grow out of the war. But one can be sure that the demand for American food products will increase. And this increase is likely to cause some headaches in certain lines of food processing, not to mention increased prices and short supplies for civilian consumers.

Fortunately, even if these changes in supply and demand cannot be exactly determined it is possible to make some enlightening approximations of what is in prospect.

First, consider the changes in domestic demand that have grown out of defense activities. While higher wages and wider employment have upgraded civilian food purchases as to quality and price, there is no reason to suspect that the civilian will demand a greater quantity of food or a greatly changed variety of food products. Therefore, the facts as to the individual civilian food consumption, as well as that of the soldier and sailor, will be as already brought out in FOOD INDUSTRIES (June, 1939, page 308). With allowance for slight changes in the Army ration, resulting from a change in regulations made in 1940, these individual requirements are shown in Table I.

If these food demands of the individual are extended to cover the needs of the whole Army, Navy and civilian population, it is necessary to assume a definite size for each group. This has been done in Table II, which compares the peace-time food demand with the approximate demand under present conditions and notes the changes that have occurred because of the increase in numbers of soldiers and sailors.

This table shows that United States requirements for food have not increased greatly as a result of defense activities, having gone up by only 0.5 percent on the whole. However, examination of the individual groups that go to make up the whole shows that certain food producers and processors face considerably greater demand, while others find less of their products needed. Of the various groups, increases are found for cereal products, potatoes, sugars, butter, vegetables, meats and fish, and fats; while decreases occur for fluid milk, manufactured milk products, fruits, eggs, and dried beans and nuts. The greatest changes noted are increased demands of 3 percent for meats and 1.2 percent for vegetables.

### *Defense Needs Negligible*

Such increases and decreases in domestic demand are not of great importance to the food industries as a whole, although they may considerably change the operations of individual food processors. In any case, the variations are no greater, if as great, as those that may occur in any year from entirely different causes such as bad weather, unusually large crops or depression.

Granted that the changes in food demand arising through our own military preparations are not of great importance, it's a different story when the effect of food shipments abroad are considered. Of course, nothing definite can yet be said as to the total quantities of food shipments that will be made. But it is possible to guess with fair accuracy as to what will be needed in large quantities.

All countries to which food will be shipped already have sources for a considerable part of their food supplies. What is sent from the United States will be largely made up of the protective foods—milk, meats, grains, fruits and vegetables—and of edible fats, of which all European countries are short. Generally speaking, these foods will be prepared in ways that promote ease of shipment and long keeping quality.

The United States has large surpluses of cereal products—corn and wheat especially. Most Europeans do not eat corn to any extent, but wheat is their most important food. Britain and other prospective users of United States foods have considerable milling capacity and this is occupied with turning homegrown, Canadian and Argentinian wheat into flour. Little U. S. wheat has been shipped or is likely to be, but flour shipments to supplement available supplies, particularly to Great Britain, are likely to reach considerable volume. So a step-up in flour output is likely.

While corn is not likely to be shipped, even as cattle food, because of scarcity of shipping space, certain products should find increased demand. Corn sirup, dextrose and starch are long-keeping and concentrated, readily fitting into the needs of the situation. Processing facilities for these corn products may need to be increased, if full domestic needs are also to be filled. If this increase proves impossible, domestic use may be somewhat curtailed.

Potatoes and sugar (other than dextrose) are not likely to be shipped from the United States to Britain and other countries, at least in any great quantities. Potatoes seem to be available already in sufficient quantity, while the United States cannot produce nearly enough sugar for its own needs, but

**TABLE I—Individual Yearly Food Requirements**

(Pounds per year)

| Food | Soldier | Sailor | Civilian |
|---|---|---|---|
| Cereal products | 329 | 310 | 217 |
| Potatoes | 228 | 228 | 164 |
| Sugar | 125 | 114 | 110 |
| Milk, fluid | 183 | 183 | 328 |
| Butter | 46 | 37 | 17 |
| Other dairy products | 29 | 12 | 28 |
| Fruits | 107 | 228 | 192 |
| Vegetables | 255 | 297 | 151 |
| Lean meat and fish | 365 | 456 | 132 |
| Eggs | 17 | 55 | 30 |
| Beans, nuts, etc | 11 | 11 | 14 |
| Fats (including bacon but not butter) | 75 | 37 | 46 |
| Coffee, spices, etc | 74 | 17 | 17 |
| | 1,844 | 1,985 | 1,446 |

must import large quantities from Cuba and other tropical countries.

Milk products will be in greatly increased demand, particularly butter, cheese and evaporated milk, large quantities of which have already been shipped to Great Britain. Milk production in this country is the highest ever recorded. Also numbers of milk cows in herds and output per cow are increasing. Another happy fact is a slight reduction in requirements for fluid milk, cheese and other milk products, caused by defense, as shown in Table II.

However, in spite of these favorable factors, there is not going to be enough milk to supply the prospective demand —neither fluid milk nor manufactured milk products. If milk is to be shipped abroad to meet the demand that now seems likely, consumption in this country will be restricted and the dairy products processors will need to increase their manufacturing capacities. In spite of the defense needs, it is extremely likely that priorities will be granted for this purpose, considering the importance of dairy products among overseas food needs.

Some increase in shipments of fruit products is likely, particularly canned citrus fruits and citrus juices and dried prunes, raisins and other fruits. However, fruit consumption will likely be somewhat less in the United States, because of defense (see Table II), and apparently fruit canners and dehydrators have sufficient capacity. Availability of these fruit supplies depends upon the size of the crops. If crops are short—and current crop reports indicate at least an average yield—domestic consumers may go short.

**TABLE II—Changes in Annual Food Demand Brought About by National Defense — Summer, 1941.**

(In Tons per year)

| Food | Peace time needs, in tons (estimated population of 133,000,000) | Civilians (130,800,000) | Army (1,800,000) | Navy (400,000) | Total defense needs, in tons | Change, in tons | Change, in percent |
|---|---|---|---|---|---|---|---|
| Cereal products | 14,430,500 | 14,191,800 | 296,100 | 62,000 | 14,549,900 | 119,400 | +0.8 |
| Potatoes | 10,906,000 | 10,725,600 | 205,200 | 45,600 | 10,976,400 | 70,400 | +0.6 |
| Sugars (cane, corn) | 7,315,000 | 7,194,000 | 112,500 | 22,800 | 7,329,300 | 14,300 | +0.2 |
| Milk, fluid | 21,812,000 | 21,451,200 | 164,700 | 36,600 | 21,652,500 | 159,500 | −0.7 |
| Butter | 1,130,500 | 1,111,800 | 41,400 | 7,400 | 1,160,600 | 30,100 | +0.3 |
| Other dairy products | 1,862,000 | 1,831,200 | 26,100 | 2,400 | 1,859,700 | 2,300 | −0.1 |
| Fruits | 12,768,000 | 12,556,800 | 96,300 | 45,600 | 12,698,700 | 70,000 | −0.5 |
| Vegetables | 10,041,500 | 9,875,400 | 229,500 | 59,400 | 10,164,300 | 122,800 | +1.2 |
| Lean meats and fish | 8,778,000 | 8,632,800 | 328,500 | 91,200 | 9,052,500 | 274,500 | +3.1 |
| Eggs | 1,995,000 | 1,962,000 | 15,300 | 11,000 | 1,988,300 | 7,000 | −0.4 |
| Beans, nuts, etc | 931,000 | 915,600 | 9,900 | 2,200 | 927,700 | 3,300 | −0.4 |
| Fats (inc. bacon but not butter) | 3,059,000 | 3,008,400 | 67,500 | 7,400 | 3,083,300 | 24,300 | +0.8 |
| Coffee, spices, etc | 1,130,500 | 1,111,800 | 66,600 | 3,400 | 1,181,800 | 51,300 | +0.5 |
| Total tonnage | 96,159,000 | 94,568,400 | 1,659,600 | 397,000 | 96,625,000 | 466,000 | +0.5 |

### *Vegetables Important*

The vegetables form, perhaps, the most interesting group of foods involved in lend-lease operations. This is because there is so much uncertainty and so much speculation as to what will be done about vegetable shipments, except as to tomatoes. From the start of the war, canned tomato products have been in demand for export, probably because they formed a convenient food for the supply of vitamin C. American farmers were urged to increase the tomato output by 50 percent this year, in order to fill this demand and meet American needs at the same time. Unfortunately, this was not done, so that domestic supplies of tomato products may be somewhat below normal, if exports are to be increased.

Other vegetables than tomatoes are not being exported to any great extent. And that is where the speculation and uncertainty come in. Both the government and commercial interests have considered the possibility of developing a greatly enlarged dehydrated vegetable industry. The low weight, small bulk and relative imperishability of these dried products offer attractive possibilities, both for Army use and for export. However, aside from progress with dehydrated vegetable soups, little beyond experimentation is yet apparent.

In the matter of supply of these vegetables, exclusive of tomatoes, considerable increases in plantings, averaging at least 10 percent, were made this year. As crop prospects seem good, no serious curtailment of supplies is in prospect.

Meat products shipments are likely to be mostly lard, cured pork and canned meats. More meats will be needed at home because of defense requirements (see Table II). Fortunately, meat packers have the necessary processing capacity and supplies of both cattle and hogs are increasing. But it takes time to bring the numbers up, particularly with cattle. Therefore, curtailment of civilian supplies in the United States is likely.

Canned fish is another food product likely to be shipped in quantity. Here the difficulty lies in supply. Catches of salmon, tuna, sardines, herring and mackerel, the important fishes for this purpose, have been relatively small in recent years and the prospect is for continued shortage. Already some canned fish is scarce and prices have increased.

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*Wide World Photos, Inc.*

**In this plant at Kansas City, Mo., eggs are being broken preparatory to drying and freezing for shipment to Great Britain. Dried eggs are the preferred form, because a case of 30 dozen shell eggs weighs only 20 lb. when dried.**

General Foods Trains Young Engineers in Plant Practices • Truck Body With Three Advantages

# Training Young Men For Supervisory Jobs

By A. L. BROWN, Post Products Division, General Foods Corp., Battle Creek, Mich.

**Expansion created a need for junior executives in General Foods Corp. The answer was to set up a training course for graduate engineers. It worked so well it has been continued as an investment in future progress. The students acquire factory experience and knowledge of plant problems.**

IN 1923, Postum Cereal Co., Battle Creek, Mich., inaugurated a practice of hiring one or two engineering graduates each year. These young men worked a short time in each department in the plant, usually spending about six months before being placed on some special job. The purpose of this training was to familiarize the men with the processes and equipment used and train them for executive or staff jobs.

Soon after formation of General Foods Corp., which resulted in the acquiring of a great many plants throughout the country and the development of new products and processes, the need for trained men for junior executive jobs presented a much greater problem.

Since the Postum Cereal Co., now Post Products Division of General Foods, is the largest unit in the corporation, with the greatest variety of jobs, it was decided to centralize the production department training at Battle Creek. More graduate engineers were hired each year and informally trained for positions in all units of the corporation. The men who had received this training proved to be of exceptional value to the organization, and in 1938 a formal student engineers' training course was established. This course was designed to give graduate engineers work experience, practical application of their engineering training, an understanding of General Foods methods and policies, contact with men in the plant and first-hand knowledge of their problems.

Men are chosen for the group from the graduating classes of various high-grade technical schools by means of interviews at the schools or at one of the various General Foods plants. In making selections particular stress is placed on personality and seeming ability to fit into the organization.

## Personal Analysis Form for Student Engineers

Judge this student engineer on each quality separately, regardless of his rating on any other quality. Consider the line under the four columns as a scale; the extreme left as perfection, the extreme right as unusually poor. Place a check on the line under the group of words which best describes the individual. A check may be placed at a point between the columns. Place only one check on a line, but it is essential that every line is checked. Approximately the center of the line will be average.

Date_____

Name_____

Dept._____

| | | | | | |
|---|---|---|---|---|---|
| 1. | Consider his ability to apply his technical training to his work | Very alert to utilize technical training in work | Frequently able to connect training with job | Has difficulty in utilizing technical training | Makes no effort to utilize training |
| 2. | Consider his ability to learn new duties and to retain knowledge | Learns duty very rapidly and thoroughly | Learns quickly, retains instructions well | Requires detailed and repeated instructions | Very slow to absorb, poor memory |
| 3. | Consider his personality — ability to gain respect and confidence of people he contacts | Exceptionally pleasing personality. Makes very good impression | Pleasant. Makes favorable impression | Reserved, quiet. Not a good mixer | Makes poor impression |
| 4. | Consider his interest and eagerness to learn | Shows maximum interest. Aggressive to learn | Quite enthusiastic; above average | Shows interest occasionally | Lacks interest; indifferent |
| 5. | Consider his ability to cooperate with co-workers as well as superiors | Goes out of way to cooperate and to secure cooperation | Cooperates when necessary. Good teamworker | Reluctant to cooperate. Fair teamworker | Obstructive. Strongly individualistic |
| 6. | Consider his perseverance— ability to overcome obstacles and to concentrate | Completes difficult jobs despite obstacles. Never gives up | Quite persistent. Not easily distracted or discouraged | Has occasional difficulty in completing jobs; often distracted | Gives up easily. Difficult to concentrate |
| 7. | Consider his judgment and common sense — ability to think intelligently and reach logical conclusions | Unusually sound judgment. Quick, logical thinker | Uses good judgment; level headed | Makes frequent errors in judgment | Usually illogical; poor judgment; unreliable |
| 8. | Consider his accuracy — thoroughness and dependability of results | Exceptionally accurate; makes errors very seldom | Work is of good quality — very few errors | Below normal — frequent errors; often not dependable | Very inaccurate; results incomplete |
| 9. | Consider quantity of work accomplished — ability to produce results | Rapid worker; big producer; maximum results | Turns out good volume. Above average | Quantity below average | Unsatisfactory quantity |
| 10. | Consider his initiative — ability to go ahead without detailed explanations | Very constructive and creative; makes frequent suggestions | Is resourceful; often devises better methods | Shows occasional initiative. Needs urging | Unprogressive; waits to be told |
| 11. | Consider his character, sense of ethics, morals, courage of convictions | Unusually honest, Fair. High principles. Good outside contacts | Respectable. Clean. Temperate | Self-indulgent. Questionable diversions | Doubtful reputation. Not trustworthy |

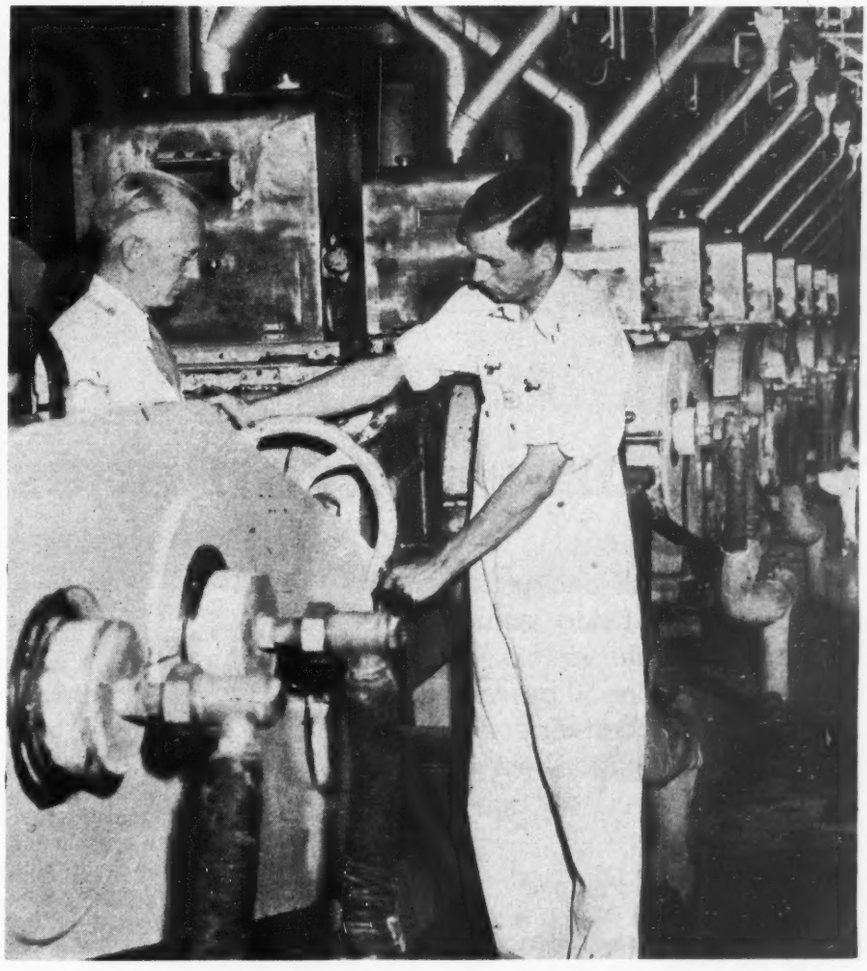
1. In your opinion does this student engineer have future supervisory possibilities?_____ Explain
2. What possible corrective, education or development measures do you recommend for this student engineer?
3. On what phase of his work does he need the most training?_____
4. Do you recommend retention in our employ of this student engineer? Why?_____
5. What are his outstanding qualifications?_____
6. What are his most apparent weaknesses?_____
7. General remarks_____

Each year an effort is made to procure students from several different schools so that the benefit of the different types of men and education can be obtained. Graduates in mechanical, electrical or chemical engineering are preferred.

The training course extends over a period of two years. The first 18 months are spent in the Battle Creek plant and the last six months in two other General Food plants. In the Battle Creek plant the student spends from two to four weeks in each department. He has a definite schedule while in the plant, and while in each department, spending sufficient time on each job to get at least a general knowledge of it. He works with, and under, the man on the job. Yet his presence in no way affects the earnings of the regular employee, and in no case is he used to replace any employee. Because of this arrangement, excellent cooperation has been received from the regular employees in assisting in the training program.

In each department, whenever possible the trainee does his share of the actual work under direction of the regular machine operator, receiving instructions about equipment and product from the operator and the department supervisor. A student in the "Grape-Nuts Flakes" department, for instance, has the following schedule:

| | |
|---|---|
| Mixers .....3 days | Rolls .....4 days |
| Cookers .....4 days | Driers .....1 day |
| Curing bins..1 day | Ovens .....2 days |
| Flake bins...1 day | Packing room.3 days |
| Oiler .....1 day | |



A typical student trainee, Herbert Hultgren, receives instructions from supervisor R. Holman, at the flaking rolls in the "Grape-Nuts Flakes" department, Post Products Division of General Foods at Battle Creek, Mich. In this department he will also do actual work, under supervision, with mixers, cookers, curing bins, oiler, rolls, driers, ovens and the packing room, thus gaining a complete picture of the problems involved in the manufacturing process.

The students go through the various processing and packing departments, the warehouse and shipping departments, all of the carton and case manufacturing departments, each craft in the maintenance department, purchasing, payroll, time study, traffic and industrial relations departments.

A complete record of progress and accomplishment of each student is maintained in the industrial relations department. The student at the end of each departmental assignment is required to write a report on his activities and observations in that department. The general outline followed in this report is:

1. Complete description of the job, including full routine, mechanical equipment used, reason for and result of each operation, and materials used and produced.
2. General observations.
3. Suggestions.

The foreman of the department makes a report on each student when he leaves the department. Both the student's and the foreman's reports are filed in the industrial relations department and numerous conferences are held with the student, going over the reports and pointing out any weakness which these reports may indicate.

The personal-analysis chart filled out by the foreman of each department as the student completes that phase of his training includes the following points, each of these points being judged separately:

Ability to apply his technical training to his work. Ability to learn new duties and to retain knowledge. Personality—ability to gain respect and confidence of people he contacts. Interest and eagerness to learn. Ability to cooperate with co-workers as well as superiors. Perseverance—ability to overcome obstacles and to concentrate. Judgment and common sense, ability to think intelligently and reach logical conclusions. Accuracy, thoroughness and dependability of results. Quality of work accomplished, initiative. Character, sense of ethics, morals and courage of convictions.

The foreman is further asked to rate the student on outstanding qualifications, most apparent weaknesses, on what phase of work he most needs training, possible correctives, his future supervisory possibilities and his value as a permanent employee to the company.

Throughout the course, discussion meetings are held one evening weekly. These discussions cover:

Raw materials used—wheat, corn, paper, ink, salt, etc. Plant—location, building, equipment. Operating, development of processes, operating problems and methods of research. Plant maintenance. And administrative—accounting, reports, industrial relations, traffic and purchasing.

These conferences are led by an executive of the plant who is a specialist on the subject. Notes are kept on the discussions and problems are worked out by the students. Materials for study and reading are recommended and supplied to supplement the discussion.

Upon completion of this course in the Post Products plant, the student

is assigned to the time study department in one of the other General Foods plants, spending three months in each of two plants. During these assignments reports are written up as they are in the Battle Creek plant. When the student has completed these latter assignments, he should have a well-rounded work experience which, coupled with his engineering education, should fit him for a responsible position with the company.

Based on the success of the informally trained engineers and the exceptional showing made by the first group to complete the formal course, it is evident that men carefully chosen, trained and followed up make better junior executives and well justify the expenditure for the training course.

# Bumblebee Truck Body Has Three Advantages

**Worth extra cost because it has high advertising value, is maneuverable in heavy traffic and carries 50 percent more load than conventional unit. Used to deliver beer in Milwaukee.**

"MILLER BUMBLEBEES" is the name given to the fleet of three streamlined local delivery trucks operated by the Miller Brewing Co., Milwaukee, Wis. The trucks get this name from the peculiar shape of the streamlined body, blunt in the front to accommodate the usual width of windshield and tapering off in curved lines to a rounded rear end.

The Miller Bumblebees are not the only trucks in the Miller Brewing Co. fleet. They were purchased particularly for the delivery of beer to hotels, taverns and restaurants in the crowded downtown streets of Milwaukee where a short overall length with a maximum carrying capacity in accordance with the tonnage rating of the chassis and easy maneuverability were the two prime requisites from an operating or delivery cost standpoint.

To those two requisites was added a third, the utmost in advertising value. Because of the many pedestrians on the crowded downtown streets, the desire was to produce a truck as different as possible from all others and thereby have it attract the most attention.

### *Body Solves Three Problems*

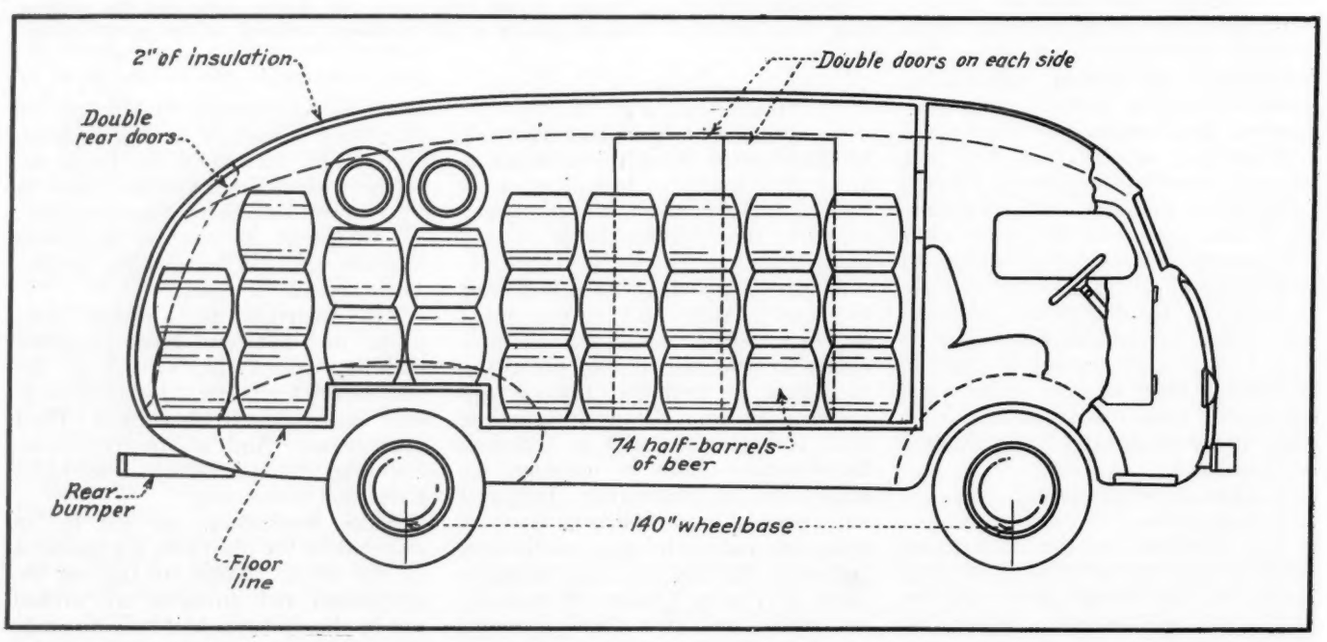
The truck shown herewith was the solution to those three automotive problems. Brooks Stevens, industrial designer, was commissioned to work out the details and produce the finished product.

The first two requisites, maximum carrying capacity on the shortest possible overall length and easy maneuverability, were attained by the selection of a cab-over-engine chassis, in this case a Dodge C.O.E. with a wheelbase of 140 in. This wheelbase accommodates a 14-ft. body. The streamlining of the body attained the third requisite.

However, the unique streamlining of the body did not lessen the practicability of the vehicle as a delivery unit. Instead it enhanced it, since the vehicle will carry one and one-half times as many half-barrels of beer as the conventional truck of the same rated capacity but with 5½ ft. less overall length. The load capacity of the streamlined truck is 74 half-barrels of beer.

The bodies were built by the Badger Auto Body Co. of Milwaukee, Wis., and have these inside dimensions: Length, 14 ft.; width, 84 in.; height, 72 in. They are made of auto-body steel, and each weighs 3,000 lb.

The body is lined throughout with




Longitudinal section through the Miller "Bumblebee" streamlined body showing position of body floor with relation to ground and how load of 74 half-barrels of beer is carried. The truck also delivers beer in cases and some mixed loads as required. The extension and position of the channel-section rear bumper protect curved rear end of body from damage due to backing up into platforms or being run into by following vehicles. This protection is important as repairs to curved body are costly.

**One of three "Miller Bumblebees" as operated by Miller Brewing Co., Milwaukee, for keg and case beer delivery in congested downtown Milwaukee. The truck is painted a bright red, with white lettering and trim, and has large-diameter chromium-plated hubcaps. The body is mounted on a Dodge cab-over-engine chassis and has exceptional advertising value. It carries one and one-half times the load of a conventional truck of the same rated capacity with 5½ ft. less of overall length.**

2 in. of "Dry-Zero" insulation. This insulation, together with the relatively short hauls made by the trucks, permits kegged beer to be delivered at approximately the same temperature at which it is loaded from the brewery cold storage rooms.

Beer in cases is also delivered by the trucks, either with kegs or in full case loads, as delivery orders require. However, since the Miller bottled beer is pasteurized, temperature conditions do not greatly affect it. Nevertheless, due to the truck insulation, the bottled beer is also delivered at approximately the same temperature as that at which it comes off the brewery labeling machines.

### *Costs More, But Worth It*

One look at the streamlined body and it is evident that its cost is in excess of that for a conventional unit, the latter consisting of the standard type of driver's cab, furnished in production quantities by truck manufacturers at relatively low cost, and a conventional box type body. There is hardly a flat surface anywhere on the streamlined body except for the windshield line and the side doors.

Thus extreme curvature of form to produce the streamlined effect explains the body cost of $1,600. This is over $1,000 in excess of the cost of a conventional body of the same carrying capacity.

However, the Miller Brewing Co. considers the additional streamlined body cost a very good investment from an advertising standpoint. It has received a surprisingly large number of favorable comments regarding the vehicles. This the company considers sufficient proof that the trucks are being noticed, the goal sought.

Aside from the unusual shape of the body itself, it attracts additional attention from the fact that it is painted a bright red. The lettering is white, as are also the molding trimmings. The showy appearance is further set off by extra-large chromium-plated hubcaps.

Further ornamentation of the body includes full-length roof molding and panel molding strips, in graceful curves, and a series of five horizontal molding strips on the bottom of the body sides between the front and rear fenders. These strips are also continued around the front of the body below the bottom of the radiator shell.

Additional construction features of the body include two sets of double side doors, one on each side, and one rear door. The side doors are set flush with the body sides with small hinges to make the doors as inconspicuous as possible and thus not detract from the appearance of the side panels. The rear door conforms in shape to the rounded rear end of the body.

In operation, the truck may be loaded at the company's regular shipping platform through either one of the two side doors or the rear door, depending upon whether keg beer or cases are being loaded. To permit the brewery side-door loading, the doors themselves are hung so that they fold back flush with the body side when open. In such a position they are inside the line of the front and rear fenders, and if the latter do not strike the wooden rubbing strip on the platform edge, neither can the side doors.

When rear-end loading is employed, the bottom of the rear door is above the platform level. This prevents the rear door from being scratched or dented.

Out on the route, either side or rear doors may be used to unload. This depends upon the make-up of the load, how it is stacked in the body and the curb unloading conditions. On streets where backing the truck up to the curb would obstruct street-car, bus or other vehicular traffic, the use of the side doors makes it easy for the driver to get rid of his delivery quickly.

### *Body Repairs Cost More*

Because of the curvatures of the surface of the Bumblebee body, any dents or deep scratches are expensive to repair. With a straight-sided body, a damaged panel may be removed and replaced with a new flat section. But with the curvatures of the Miller body, any damaged section must be replaced by a sheet curved to fit the contour of the body.

To prevent expensive body repairs of the above nature, the truck is equipped with adequate front and rear bumpers. The rear bumper is made of channel-section steel and extends far enough out in back of the curved rear end to protect it under all conditions.

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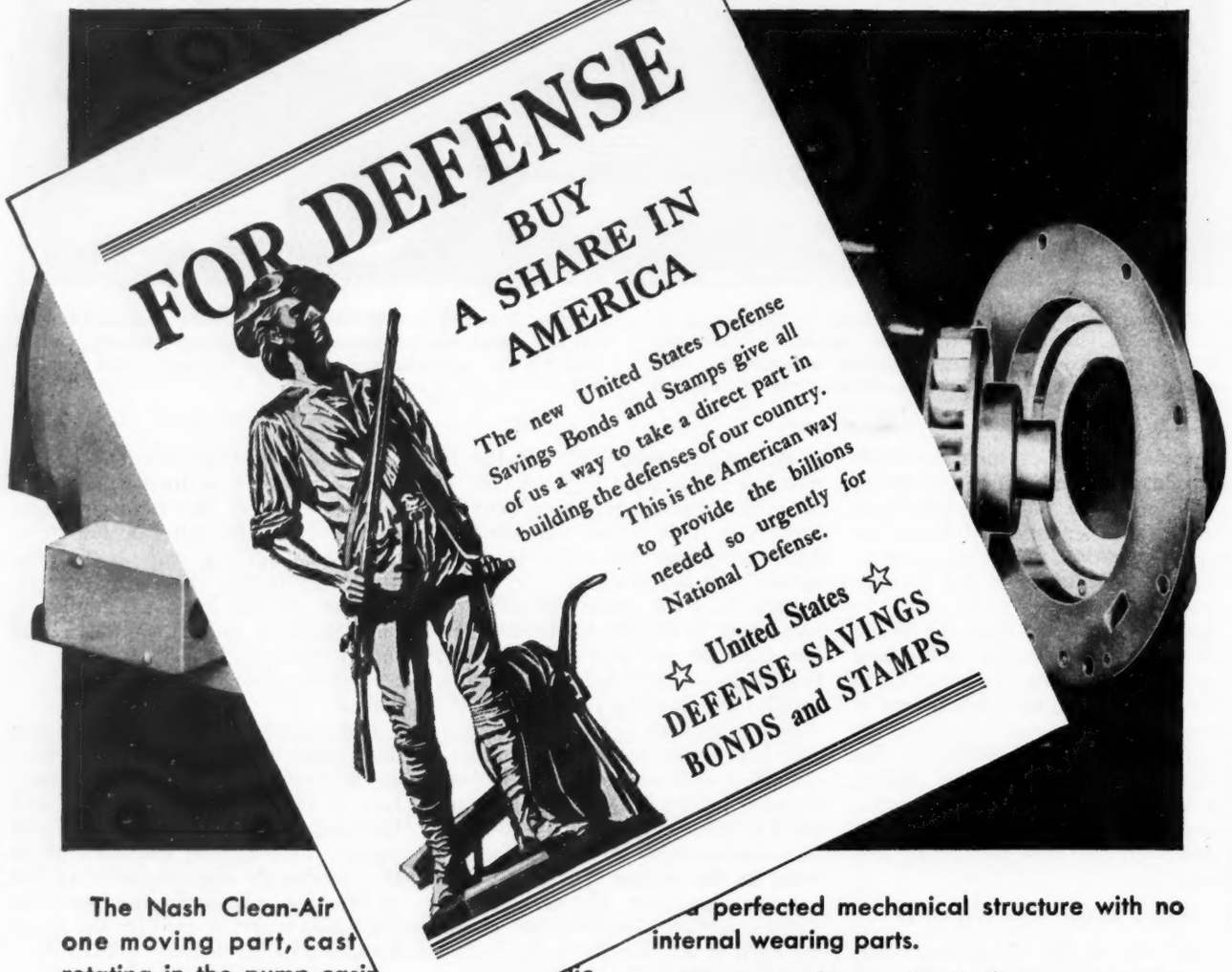
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The Nash Clean-Air [illegible] one moving part, cast [illegible] rotating in the pump casin[illegible]allic contact. No internal lubrica[illegible]ecessary; therefore air or other gas compressed with a Nash is entirely free from oil contamination.

Dust and heat are removed from the air, or gas compressed, by the unique Nash "Liquid Piston". Air from a Nash Compressor is therefore delivered free from dust, heat, or oil, without supplementary filters or air washers, [illegible]a perfected mechanical structure with no internal wearing parts.

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**THE NASH ENGINEERING COMPANY**

**220 WILSON ROAD, SOUTH NORWALK, CONNECTICUT, U. S. A.**

# FOOD INDUSTRY NEWS

GENERAL NEWS • TRENDS • MEN • JOBS • COMPANIES • SEPTEMBER, 1941

## Ceiling on Sugar Prices Set As New Quotas Fail

### OPACS acts in effort to stabilize market. Hoarding seen in anticipation of shortage

CEILING PRICES on sugar were set on August 12 by OPACS Administrator Henderson after four increases in sugar import quotas had been made in an attempt to stabilize the sugar price. The Department of Agriculture reports that "hoards" of sugar are apparently being built in anticipation of shortage.

Fears of sugar shortage have been based on the United States' dependence on off-shore suppliers. This requires transport by water to the United States for over two-thirds of our normal requirements. With shipping space becoming more and more scarce, consumers anticipate difficulty in obtaining the desired tonnage of sugar. Also feared is possible diversion of some of the sugar from the West Indies area to the United Kingdom. Normally England gets large quantities of sugar from the Far East. When the shipping situation becomes so acute that British sugar must be obtained closer to the point of consumption, then the West Indies may have to divide its supply between the Democracies.

The Department of Agriculture has issued statements discounting the possibility that war losses of shipping might interfere with the importation of sugar for the United States. Nothing has been said officially about increasing domestic sugar production. Carrying out threats to repeat the September, 1939, suspension of all import and marketing restrictions will probably not be necessary now, unless stocks decrease more rapidly than anticipated.

## New Pure Food Law Enacted by Venezuela

A NEW pure food law has gone into effect in Venezuela. The requirements of this new law are quite detailed and the law itself is a voluminous document.

One of the requirements which has come to the attention of United States food manufacturers is a certificate from the "Minister of Health" guaranteeing that the accompanying import complies with pure food laws in the country of origin. In the absence of such an officer in this country, the Food and Drug Administration suggests that certificates from a State or city board of health might be sufficient. A deposition at a consular office may also satisfy this requirement.

## Action on Several Standards Due

### Sweetened condensed milk order amended as directed by court following Staley appeal

QUITE a number of actions on food standards are expected momentarily. Actual progress which can be reported since last month is comparatively slight, however.

An amendment to the sweetened condensed milk order was issued in the August 8 *Federal Register*. This was done in compliance with the direction of the 7th Circuit Court following A. E. Staley's appeal. The amended order was in the form of one additional finding of fact as follows:

"Finding 11. The evidence of record at the hearing does not establish (a) that corn sirup has ever been used in commercial production of sweetened condensed milk, or (b) that corn sirup is suitable for use as a saccharine ingredient in sweetened condensed milk."

No change was made in the standard itself. Whether this action will satisfy the appellant remains to be seen. Further appeal may be possible, or a request may be made for an amendment to the standard. The latter would require announcement of a new docket with the usual 30-day notice before public hearing.

The bread hearing finally adjourned on August 15, after being in session about six weeks. A separate story on this hearing will be found in this issue.

Announcement of open meetings of the Food Standards Committee on shucked oysters and on rye and soybean flours implies that future dockets may be expected for formal public hearing. The committee meetings, open to the public, are on September 10, 11 and 12, respectively, and are informal in character. They are designed to educate the Food Standards Committee, and the Food and Drug Administration, so that proposed standards may be drawn up for future consideration.

Citrus fruits, ice creams, and malted milk have been the subjects of previous committee meetings, but have not yet been assigned formal hearing status. Ice creams will probably not be taken up until the slack season for this industry, some time during the fall or winter. Malted milk standards, not proposed at the time other milk products were standardized, may be expected at some indefinite time in the future.

## Hot-Frosted Foods

"HOT-FROSTED FOODS" have been developed and introduced in Boston by the Thompson's Spa restaurant chain,

A SAUSAGE BUT FOR HAT

Humorist Irvin S. Cobb's hat is credited with saving him from ending up as a sausage when he visited the plant of Rath Packing Co., Waterloo, Ia., on the occasion of its 50th anniversary last month. Here he stands agape as he is shown a package of "Black Hawk" bacon. Several notables in the meat industry also attended the birthday celebration.

which has long catered to the city's gourmets. Famous items from the Thompson menu, such as curry of chicken, pot roast of beef, minced leg of lamb, lobster Newburg and halibut a la king, are cooked as they would be for serving, then quick-frozen and packaged in neat, pocket-size containers. These Thompson specialities can be kept in the customer's refrigerator until ready to be heated and served to private tables in Cambridge and Chestnut Hill.

Thompson developed this process of preserving its specialities in collaboration with another Boston concern, Frosted Cooked Foods.

# F & D A Concludes Hearing On Standards for Bread

## Mold inhibitors major bone of contention. Amounts of enrichment ingredients changed

SIX WEEKS of discussion on bread standards came to an end on August 15, but there is the possibility that the hearing will be resumed to reconsider both enriched bread and enriched flour simultaneously. If this latter procedure is adopted, announcement will presumably be made prior to the first of the year, the effective date of the enriched flour standard.

The major bone of contention during the second half of the bread hearing, from the standpoint of time consumed, was the subject of rope and mold control. Since no provision had been made in the proposed standard for such a component as du Pont's "Mycoban," an extensive record was made by representatives of this company. Industry supporters demonstrated the widespread need for rope and mold control in addition to the best possible bakery sanitation measures. But these materials were officially classed as "preservatives," a term bitterly opposed by their proponents.

During the course of the hearing, F&DA spokesmen formally proposed deletion of that section of the proposed standards which would provide for the use of vinegar and/or monocalcium phosphate as an optional ingredient in bread. It was this traditional ingredient and its more recently introduced chemical competitor that were originally proposed for pH control in bread doughs to prevent rope. The final decision as to use (and label declaration) of these materials, including "Mycoban," is now in the hands of the Federal Security Administrator.

One other F&DA proposal to modify the proposed standard would limit soybean flour to ground raw hulled soybeans and would limit the amount to 1 percent on flour basis. Industry testimony was introduced to demonstrate that this restriction would not be justified.

### *F&DA's Philosophy*

The governing philosophy of the Food and Drug Administration in setting standards for breads other than white bread is to produce a product recognizably different from white bread, and one which would not require labeling or advertising to identify in what respect it differed. The chief government complaint was that the consumer can now tell that there is a difference between two loaves of bread, but he can't tell what caused it, unless he reads and believes the label. This feeling accounts for the widespread difference between the government proposed 5 percent egg solids in egg bread and the present industry practice of approximately 2 percent; and the even wider gap between proposed 16 percent and practiced 4 percent honey solids in honey bread. The probable result of enactment of such standards would be disappearance of the featuring of these varieties of bread.

### *Enrichment Ingredients*

Enriched bread was handled with expedition, the government and industry agreeing on all features of the program but riboflavin. Although the proposed standard for enriched bread, as printed in the *Federal Register* on June 7, was based on the standard for enriched flour, additional information on the subject has developed since the flour hearing. This occasioned the following new proposal of amounts of enriching ingredients by the government at the August hearing:

| Ingredient | Amount per pound of bread (Minimum) | (Maximum) |
|---|---|---|
| Vitamin $B_1$ | 1.1 mg. | 2.2 mg. |
| Riboflavin | 0.8 mg. | 1.6 mg. |
| Nicotinic acid | 10 mg. | 20 mg. |
| Iron | 8 mg. | 16 mg. |
| Vitamin D (optional) | 150 USP units | 600 USP units |
| Calcium (optional) | 300 mg. | 1200 mg. |

Bakers and the nutritionists (National Research Council Committee on Food and Nutrition) held out for lower amounts of riboflavin, asking 0.6 and 1.2 milligrams per pound of bread as minimum and maximum limits. This lower amount could be attained by use of 6 percent dried skim milk, already common practice in some breads it was pointed out, without requiring use of any synthetic riboflavin, adequate manufacturing capacity for which is not yet developed. Objections to mandatory inclusion of riboflavin in enriched flour presumably still stand.

The only enriching ingredient to suffer loss on baking or toasting of the bread, and for which some compensation was therefore planned, is reported to be thiamin (vitamin $B_1$). Tests were reported to show losses averaging about 20 percent.

Briefs must be submitted by October 6 to support the record-length (4163-page) record.

## Sugar, Grapefruit, Beef Duties May Be Cut

THE CUBAN trade agreement will be supplemented by negotiations which include a public hearing to begin September 8. In the list of products on which the United States will consider granting concessions to Cuba are certain sugars, sirups and molasses; fresh, chilled or frozen beef and veal; and grapefruit. Details of the proposal are printed in the *Federal Register* for July 29. Any concessions granted would apply to all other countries with which the United States now has normal trade relations.

# Food Held Key To Nazi Defeat

## "Food will win war and write the peace" is now official policy of Administration

SECRETARY WICKARD'S war slogan—"Food will win the war and write the peace"—is now official Administration policy. President Roosevelt has used the thought in a letter to Wickard calling food a "weapon against Hitlerism" just as much as "munitions" and an instrument for "welding a peaceful world."

At mid-month, this growing philosophy in Washington was due for concrete illustration in the form of accelerated food purchases for lend-lease distribution. Of the second lend-lease appropriation—reportedly $6,000,000,000—as much as one-third may be allocated for foodstuffs. Britain is seeking a sizable increase in food shipments, and American authorities plan sending large supplies to Russia if the Soviets hold out. Destruction of the Ukraine wheat crop may bring that country into the lend-lease picture, but for the most part purchases will continue to be concentrated in the lines in which Surplus Marketing Administration has been active in recent months.

*Photo: Signal Corps, U.S. Army*

**Lieutenant Colonel R. A. Isker, head of the Chicago Quartermaster Depot Subsistence Research Laboratory, and Captain C. G. Herman, his assistant, conduct bread dough tests.**

# Laboratory Guards Soldiers' Diet

THE only Army establishment of its kind in the country, the Quartermaster Corps Subsistence Research Laboratory, at Chicago, plays a key role in the feeding of 1,400,000 men. One of its recent tasks was to determine for Army cooks how to prepare vegetables in order to retain their food value to the greatest extent.

An important function of the laboratory is the testing of new food items submitted by food manufacturers for possible use by the Army. The following analysis procedure is used in passing on any new item: Availability of materials, suitability, palatability, nutritive value, keeping qualities and cost. Emphasis is placed on the vitamin and calorie content of foods.

Expecting the tin shortage, the laboratory started packaging experiments as long as two years ago. This work has established these qualities as those of the ideal container: Shatterproof, but containing neither tin nor aluminum; hermetically sealed; capable of being processed under high internal pressure; economical; suitable to high-speed production; and able to protect its contents from deterioration.

*Photo: Signal Corps, U.S. Army*

**Lieutenant R. R. Melson of the Chicago Quartermaster Depot Subsistence Research Laboratory makes moisture assay on Type C ration.**

# Dried Egg Output To Be Expanded

**Plans worked out to increase capacity more than eight-fold to meet British demands**

PRIVATE industry and Government defense officials have worked out a program quickly to expand the nation's egg drying capacity by more than eight times. Project priority ratings are being granted to between 35 and 40 concerns to install necessary materials and machinery to handle approximately 100,000,000 lb. annually. Present capacity is about 12,000,000 lb.

Practically all the new capacity will be for lend-lease supply to Britain. Supply experts of that nation estimate their requirements at nearly 100,000,000 lb. a year. Domestic requirements, together with those of the Army and Navy, are calculated to require about 14,000,000 lb.

The egg drying projects all will get a blanket priority rating for needed materials. It is expected also that the projects will be given the necessary certification for five-year tax amortization. Most of them will be in the Midwest.

After the egg drying program is taken care of, officials handling food supply problems for Britain expect to undertake a similar expansion program for dried milk production. The size of this program has not been worked out.

# Government Will Take 20 Percent of Salmon

INFORMAL confidences between salmon canners and the Civilian Supply Division of OPACS have resulted in agreement by the industry to make available for lend-lease purchase and the American military forces 1,200,000 cases of salmon (20 percent of the pack) without unduly disturbing the bulk civilian market of "pinks."

Quantities to be reserved for government requirements are: 450,000 cases (45 percent) of reds in No. 1 tall or No. 1 flat cans, or both; the entire pack of cohoes, all in No. 1 tall cans; 100,000 cases of chums in either tall or flat 1's; 450,000 cases of pinks in either tall or flat 1's. Each packer agreed to set aside his share of each grade and to submit bids no later than September 5.

If the program goes through as outlined, OPACS officials said there will be no necessity for putting price ceilings on canned salmon. Without the agreement, OPACS feared an excessive portion of the government buying would have come from pink grades.

# There's No Future In It!

EVEN if you could get the peelings thinner by lathering potatoes . . . it isn't the best way to win a war.

Production, armament production, is the key to America's future . . . *and food is armament!*

Kemp can help you *two ways* in getting greater production from existing facilities:

First, Kemp equipment speeds up roasting, toasting, high-temperature cooking wherever it can be done without injury to the product, and Kemp speeds up drying and can-making operations.

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And while production is of first importance, the fact that Kemp is saving from 15 to 40 percent in fuel for other food field producers, may help you to smile when you meet the tax collector.

Write, wire or phone to tell us what you want done faster.
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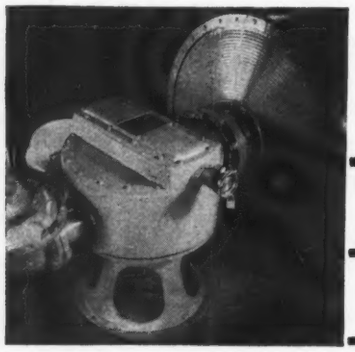

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## ANSWERS TO FOOD LAW QUESTIONS

### Interpretative Opinions from F&DA Letters to the Industry

THE trade correspondence of the Food and Drug Administration has included in recent months two items of interest to food manufacturers. These are abstracted below, continuing the series of "Answers," last printed on page 83 of the June issue.

#### *Abstracts*

227. When a product label includes the ingredient term "vitamin B complex," consequential amounts of thiamin, nicotinic acid, and riboflavin should be furnished, as well as demonstrable amounts of the other components of the vitamin B complex which have been identified; for example, the general term should not be used when only thiamin, nicotinic acid, and/or riboflavin are added.

228. Exemption permitting shipment of *unlabeled goods* requires existence of written agreement in which specific labeling to be used is clearly outlined.

## Canners Permitted To Hire Young Girls

CALIFORNIA canners have been granted permission by the Department of Labor's Public Contracts Division to employ girls between 16 and 18 years of age when they are unable to obtain adult workers. The action came after canners informed the departments of Labor and War that a shortage of labor in the area required temporary relaxation of Walsh-Healey Act provisions if the current crops are to be packed.

## SCHEDULE OF EVENTS

**SEPTEMBER**

4– 6—New England Association of Ice Cream Manufacturers, Poland Spring House, Poland Spring, Me.
4– 6—Northern Nut Growers Association, Hershey, Pa.
8—Course in Baking and Milling Technology, Siebel Institute, Chicago.
8–10—National Coffee Association, White Sulphur Springs, W. Va.
8–12—American Chemical Society, Atlantic City, N. J.

**OCTOBER**

6– 7—Boston Conference on Distribution, Hotel Statler, Boston.
12–15—American Bakers Association, Hotel Statler, Boston.
12–19—National Wine Week.
14–17—American Public Health Association, Convention Hall, Atlantic City, N. J.
16–18—National Association of Retail Ice Cream Manufacturers, Hotel Niagara, Niagara Falls, N. Y.
20–22—International Association of Ice Cream Manufacturers, King Edward Hotel, Toronto, Canada.
23–25—International Association of Milk Dealers, King Edward Hotel, Toronto, Canada.
20–25—Dairy Industries Exposition, Toronto, Canada.

# Lend-Lease Requirements Step Up SMA Purchases

## Most of the procurements are for Britain; Total to date exceeds $150,000,000

SURPLUS Marketing Administration's purchases since the lend-lease program was inaugurated now exceed $150,000,000 and are increasing in pace monthly. Most of the agency's procurement is for British order, a fact which dictates the lines in which SMA is most active—pork and dairy products, dried beans, some fruits and cereals.

Of recent weeks, SMA has been making purchases of fresh fruits and vegetables. These are primarily to support local markets and the commodities are being used for relief distribution in kind and, when schools open, will be included in school lunches. These purchases, however, are not at the expense of processed foods for lend-lease; instead, they represent merely increased buying.

A cumulative total of SMA purchases through Aug. 9 follows:

| *Commodity* | *Quantity* |
|---|---|
| Meat products | |
| Lard | 173,035,503 lb. |
| Pork meat products (canned) | 73,754,256 lb. |
| Pork meat products (cured and frozen) | 128,833,500 lb. |
| Pork meat products (casings) | 983,175 100-yd. bundles |
| Dried beef | 11,000 lb. |
| Dairy and poultry products | |
| Cheese | 54,463,024 lb. |
| Dry skim milk | 15,303,800 lb. |
| Dry whole milk | 900,000 lb. |
| Evaporated milk | 3,692,150 cases |
| Butter | 65,787 lb. |
| Dried eggs | 9,309,775 lb. |
| Frozen eggs | 63,984,870 lb. |
| Shell eggs | 1,268,270 cases |
| Vegetables | |
| Canned tomatoes (spots) | 1,354,661 cases |
| Canned tomatoes (futures) | 2,679,040 cases |
| Dry beans | 174,508,400 lb. |
| Carrots | 894 tons |
| Onions | 18,500 50 lb. sacks |
| White potatoes | 1,687,542 bu. |
| Cabbage | 153,610 bu. |
| Fresh beets | 50,896 bu. |
| Canned potatoes | 189,200 cases |
| Soy beans | 9,070,000 lb. |
| Snap beans | 742 bu. |
| Fresh peas | 67,800 bu. |
| Fresh tomatoes | 4,457 bu. |
| Fresh corn | 649 bu. |
| Fruit | |
| Fresh apples | 1,523,755 bu. |
| Fresh grapefruit | 7,036 tons |
| Grapefruit (for juice) | 3,744 tons |
| Canned grapefruit (segments) | 398,418 cases |
| Canned grapefruit juice | 643,200 cases |
| Oranges | 503,580 boxes |
| Dried prunes | 70,671 tons |
| Raisins | 31,100 tons |
| Dried apples | 4,594,275 lb. |
| Fresh strawberries (uncapped) | 130,615 lb. |
| Dried apricots | 5,343 tons |
| Dried peaches | 4,450,000 lb. |
| Dried apple pomace | 418,180 lb. |
| Dried pears | 1,150,000 lb. |
| Mixed dried fruit | 80,000 lb. |
| Fresh plums | 47,237 boxes |
| Fresh peaches | 592,171 bu. |
| Grain and grain products | |
| Biscuits (hardbread) | 220,000 lb. |
| Cornstarch | 75,760,000 lb. |
| White flour (enriched) | 690,685 bbl. |
| Graham flour | 150,050 bbl. |
| Rice | 3,200,000 lb. |
| Cracked wheat | 14,800,000 lb. |
| Corn grits | 75,000 bbl. |
| Oat cereal | 39,505,220 lb. |
| *Oats | 178,000 bu. |
| *Exchanged for 3,225,240 lb of oat cereal. | |
| Wheat meal | 500,000 lb. |
| Fish | |
| Canned fish (spots) | 391,722 cases |
| Canned fish (futures) | 1,107,700 cases |
| Miscellaneous foods | |
| Canned pork and beans | 158,300 cases |
| Dehydrated soup | 4,500,000 lb. |
| Cane sirup | 10,000 cases |
| Corn sugar | 5,696,000 lb. |
| Concentrated orange juice | 180,383 gal. |
| Peanut butter | 1,762,000 lb. |
| Oleomargarine | 1,120,000 lb. |
| Honey | 3,558,000 lb. |
| Citrus pectin | 581,000 lb. |
| Soy flour | 4,640,000 lb. |
| Orange marmalade pulp | 218,400 lb. |
| Enzymes | 3,360 lb. |
| Vitamin concentrates | |
| Vitamin A — fish liver oil or vitamin A concentrates in oil | 188,346.5 lb. (or 2,751,483 million units) |
| Pro-vitamin A — carotene in oil solution | 2,205 lb. (or 75,000 million units of vitamin A) |
| Vitamin $B_1$ — thiamin hydrochloride | 8,741.239 lb. |
| Vitamin C — ascorbic acid | 5,000 lb. |

## Kitchen Locker Plant

A NEW FACTOR in the field of frozen foods is the home frozen food locker plant announced by Stewart-Warner Corp. Called the "Eskimo Pantry," it has a capacity of 5.14 cu. ft. and is capable of maintaining subzero temperatures. Since it will accommodate 100 lb. of food, it permits buying of frozen products in bulk quantities. And it can even be used for freezing products in the home, as might be done on the farm.

## Vote Anti-oleo Fund

TO CARRY on opposition to the new Federal standards for oleomargarine, delegates from the dairy states, meeting in Chicago on August 7, voted to raise a fund of $5,000. This action was taken at a United Dairy Committee meeting because the delegates believe that the oleomargarine standards legalize the imitation of butter and jeopardize the well-being of the important dairy industry.

## Industry To Get Chlorine

CHLORINE has been placed under full priority control, but supplies have been allocated to meet the requirements of seven essential public services. Included in these is the processing of food products.

## Navy Salutes Boned Beef

AFTER reviewing reports of extensive tests, the Navy has decided to buy boneless beef almost exclusively in the future. Boned beef, experiments showed, can be stored much more effectively and efficiently aboard ships and larger quantities may be packed at one time.

DRAMATIZE WAR ON MALNUTRITION

Paul V. McNutt, Federal Security Administrator, and Una Merkel, screen actress, go on the air with Dr. Morris Fishbein, editor of the "Journal of the American Medical Association," in the program "Listen America." Broadcast over the NBC Red Network, the program dramatized America's war against malnutrition.

# CAPITAL VIEWS

HAWAII DOING

**Harry MacConaughey, vice-president and general sales manager for Dole Hawaiian Pineapple Co., Ltd., is served a cup of cool pineapple juice, fresh from a faucet, while on his annual visit to the Honolulu plant. The Hawaiian girl is one of the regular staff of guides who show approximately 30,000 visitors through the cannery every year and explain how Dole products are prepared.**

## OK's Canned, Powdered Fruit Juice for Army

LEGISLATION legalizing use of canned and powdered fruit juices in the rations for men in the Army and Navy has been passed by the Senate and is expected to get routine House approval. The bill provides that in place of 16 oz. of fresh fruit, service men may be given 6 oz. of canned fruit or tomato juices, 1 oz. of powdered fruit juice or 0.6 oz. of concentrated fruit juice per day.

The Senate committee report on this bill carried the following table of estimated comparative cost data for the various types of ration:

| | |
|---|---|
| Average cost of present fresh-fruit ration | $0.034 |
| Estimated cost of fruit-jice ration. | .022 |
| Estimated cost of powdered fruit-juice ration | .025 |
| Estimated cost of concentrated fruit-juice ration | .03 |

## 1941 Tomato Pack Short of SMA Goal

THE NATIONAL drive by Surplus Marketing Administration and the Department of Agriculture to increase the 1941 tomato pack by 15,000,000 cases (50 percent) now admittedly will fall short of its goal. Drought and the fact that many early plants were already in before the program started are the reasons given.

Officials, however, insist that no hardship need result either to the British lend-lease program or to the American domestic market as a result. The 15,000,000-case figure represented a point to shoot at rather than a minimum requirement, it is stated now.

Through August 9, SMA had purchased 1,354,661 cases of spots and 2,679,040 cases of futures. Invitations for additional purchases, running perhaps as high as the combined total of those already made, are expected, but the agency intends to restrict its program so as not to "short" the domestic market.

**SIX WEEKS!**—It often takes six weeks for a single series of hearings when a food standard is being established. This was the experience with the bread standard, despite the fact that the industry thought that two days, and officials that two or three weeks, would suffice. When the ice cream, carbonated-beverage and flavoring-extract hearings begin we can expect similar protracted meetings. It takes a long time to get all the facts in the record. And it is extremely important that each ingredient get its story into the record, or it may be left out of the standard.

**MORE TAXES**—The new tax bill will raise more than $3.5 billion. This is necessary as the costs of aiding Britain rise to astronomic figures. Some of the food industries which have escaped for a time from new levies are not at all sure to escape these burdens when the Senate acts. "Non essential" foods are almost certain to bear new excise taxes.

**FOOD PRICE FIXED**—The first food to encounter OPACS price regulation was sugar. Fear of shortage was not allayed by promise of increased imports. Sugar users feared that the government had not enough influence to get sugar into the country to meet the full demand, which increases with prosperity. Shortage of ships was likely to be the bottleneck, even with the best planning and the biggest quotas which the Department of Agriculture could provide. It remains to be seen whether there may not be bulges even in the price ceiling as first fixed. Certainly those who had been indulging in speculative buying hope so; but it will not come soon enough to help them out, Washington believes.

**NEW PRICE "SQUEEZE"**—Processors of food are going to be squeezed between the rise in raw material costs and fixed-ceiling prices. That is not news; it has long been recognized by students of the Washington trends. But it is new, if not news, that Washington admits that processors are expected to take increasing costs out of their profit margin. This fact is now stated very frankly at OPACS headquarters. There seems to be very little which food processors can do about it except to anticipate a profitless period. One small comfort is the fact that there will be very few, if any, excess profits taxes to be paid, and perhaps no income taxes either, if the trend is pushed very hard as some of the "reform element" of Washington would like.

**VIOLENT VITAMINS**—Vitamins are certainly very effective in promoting vigorous activity in Washington. (If they are half as beneficial to those who eat them, they must be exceptionally potent.) Proceeding from almost identical facts, there are two schools of thought vigorously arguing for their particular theories in several food fields. The butter and margarine groups are arguing over the oleo standard. And Ardent Advocate Russell Wilder is still campaigning at FSA headquarters to force F&DA to accept his theories regarding enriched flour and enriched bread. And there is no evidence that this controversy will soon be settled.

**MORE FOOD BUYING**—Much enlarged plans for food buying for Britain are being developed. Any food manufacturer who produces goods likely to be needed for this purpose should expect soon some very large new orders. The eight-fold increase in dried-egg business is one example.

**SHORTAGE ADMITTED**—Abundant food for all purposes has been glibly forecast by Washington. But now even officials of the Department of Agriculture admit that there is going to be a shortage of canned tomatoes. This shortage has long been anticipated by the industry. Other shortages anticipated by other groups among food manufacturers will come just as surely, even if official Washington will not concede the possibility at this stage.

Severe shortages in supply seem almost certain in several important commodities. But persons interested in securing these commodities are being warned against speculative purchasing. That practice is very dangerous. It may leave the purchaser with a high cost stock after a price ceiling has been set under him. Or he may even suffer the indignity of having the government commandeer some of his stock at a low price in order to turn it over to a competitor who may not have been so farsighted.

**RETROACTIVE**—Settlement of charges for sugar delivered under old contracts may not be made above the ceiling price effective August 14, unless a special OPACS permit is first obtained. Thus, in effect, the sugar price ceiling cancels all outstanding sugar agreements as of that date. Some court test of this may come; but, pending adjudication, it is safe to assume that sugar buyers need not pay more than the ceiling price.

## Huge Food Stores May Be Created

**Washington laying plans for "greatest relief expedition of history" after the war**

IN ADDITION to expansion of this lend-lease program, there is shaping up in government circles plans for what is being termed the "greatest relief expedition of history" after the war is over. Huge stores of food and other relief articles are contemplated, to provide a backlog with which to feed and clothe the populations of captive countries after the peace is signed.

Details are not in concrete form yet, but the objective is fixed—to carry out in fullest degree the Wickard slogan. The Surplus Marketing Administration, which is the official lend-lease purchase agency, can be expected to handle purchases and distribution of the after-war stocks.

## Soldiers Test Value Of Fortified Bread

THE Army is making extensive tests of enriched bread in the soldier diet. All during August, soldiers at Fort Meade, in Maryland, were alternately given three types of enriched bread as part of regular mess rations.

Once each week, bread made with fortified flour was served. On two days a week, the men were served bread made with enriched yeast. On the other four days, bread made with brewers' yeast was provided. Samples of each type, baked at the post bakery, are being analyzed at recognized vitamin laboratories. Results will guide the Quartermaster Corps in determining general Army use in the future.

During the month, soldiers at Fort Monroe, Va., and Fort Story, Va., also ate enriched bread obtained from commercial bakers.

## Puts Ceiling on Tin Price

BECAUSE of the inflationary situation in tin prices, created by concern over shipments from the Far East, OPACS established a ceiling price of 52 cents a pound on "Grade A" pig tin on August 15.

## AMS Standards Proposed

TENTATIVE standards for grades of peanut butter, cucumber pickles, canned orange juice and canned blended orange juice and grapefruit juice have been proposed by the Agricultural Marketing Service. At the present time they are


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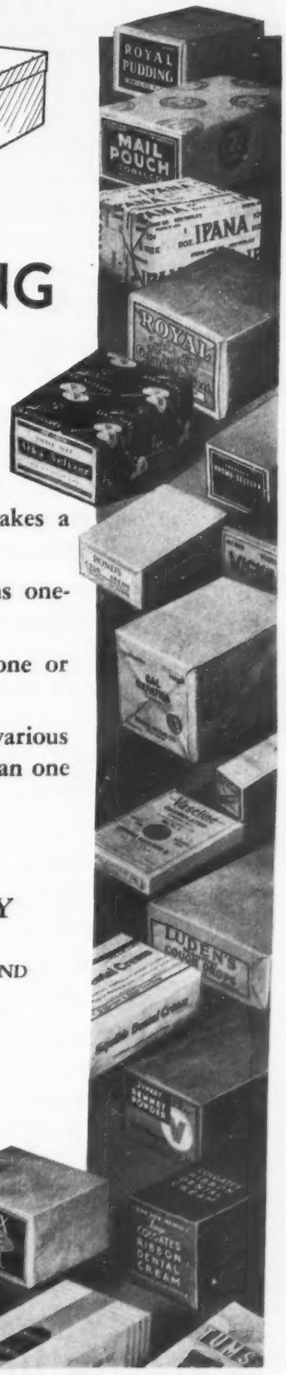


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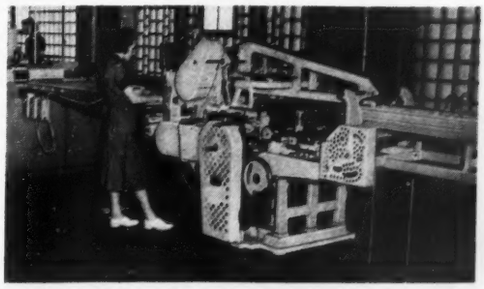

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VIKING PUMP CO.
CEDAR FALLS, IOWA

in preliminary draft form only. When they have been officially recommended as tentative standards, they will be abstracted in FOOD INDUSTRIES.

## Government Seizes Weevil-infested Flour

IN the largest food seizure in its 35 years of existence, the Federal Food and Drug Administration impounded 160 cars—60,000 bbl.—of flour in Chicago on August 7. The seizure was made on a libel of adulteration, "in violation of the law," from the Federal Court, sworn to by the FDA. Actually the seizure was made because of weevil infestation.

On August 12, a similar seizure of more than 40 cars—approximately 18,000 bbl.—was made in Detroit, Mich.

In both cases the flour was owned by the Gordon Baking Co. and stored in its warehouses designed for holding flour sufficiently long to obtain biochemical, "natural," aging. Some of the seized flour had been in storage for several months. Because of that fact, the infestation is regarded as occurring at point of location instead of at point of origin. The flour came from both northwestern and southwestern flour mills, with none shipped on recent dates.

Adjudication under posted bond with the Federal Court permits examination of the flour under the supervision of the FDA to determine and destroy the portion "unfit for human consumption".

While full extent of the infestation is yet to be determined, loss to the Gordon Baking Co. is expected to be heavy.

Heretofore, flour seizures for weevil infestation have been few and on small-lot basis as part of routine inspection procedure in all plants and warehouses in which flour and other perishables are stored or handled.

## Milk and Poultry Products Regulations

RULES and regulations for sampling, grading, grade labeling and supervision of packaging of butter, cheese, eggs, poultry and dressed domestic rabbits were promulgated by the Agricultural Marketing Service in the *Federal Register* for July 23. These regulations are brought out under the authority of the Farm Products Inspection Act and will take effect October 1.

Regulations include details of the services offered by AMS. For details as to who may obtain sampling and grading, how they may be obtained, fees and charges for the services and appeals in case grading is thought not satisfactory, reference should be made to the *Federal Register* referred to above. Copies may be obtained from the Superintendent of Documents, Washington, D. C., for 10 cents each.

# CONSTRUCTION NEWS

| | Pending (thousands) | Awarded August (thousands) | Total Awarded 1941 (thousands) |
|---|---|---|---|
| Bakery | ..... | ..... | $3,730 |
| Beverages | $1,695 | ..... | 5,819 |
| Canning and Preserving | 40 | ..... | 428 |
| Cold Storage Plants | ..... | $60 | 753 |
| Confectionery | ..... | ..... | 185 |
| Grain Mill Products | 240 | 45 | 5,400 |
| Ice Manufactured | ..... | 55 | 235 |
| Meats and Meat Products | 40 | ..... | 987 |
| Milk Products | 120 | ..... | 1,791 |
| Miscellaneous | 200 | 80 | 3,522 |
| | $2,335 | $240 | $22,850 |

## Paperboard Price Upped

BASE PRICES of paperboard will be increased $2.50 per ton east of the Rocky Mountains under an agreement reached between leading paperboard producers and OPACS on August 4.

## Seasonal Exemption Granted Nut Packers

THE PACKING, storing and drying of unshelled walnuts and filberts have been found entitled to the 14-week seasonal exemption from the hours provisions of the Fair Labor Standards Act. This ruling was announced on August 19 by Administrator Fleming of the Wage and Hour Division of the Department of Labor.

## More Frozen Food Outlets

NO LESS than 8,000 stores in the larger cities of the country have installed retail storage boxes for handling frozen foods during the past year, according to Arthur C. Jones, president of Bob-White Frosted Foods Corp., New York. And in rural or small urban communities, some 1,500 locker plants have been established in the same space of time.

## Increase Sought in Soy Protein Output

OFFICIAL encouragement is being given to increase about four-fold the amount of soybean protein available to supplement reduced casein supply. With in-

creased demands for all types of edible milk products, the available supplies of casein are smaller. Defense activities have also operated to increase the demand for casein. The result is a shortage of casein which is getting progressively worse.

## Eating Habits Change

DATA COMPILED by the Department of Commerce from reports of the Bureau of the Census indicate considerable changes in the foods selected by the American people for a popular place in the diet.

Canned food consumption has increased greatly in the two decades following the 1919 census. In that period, canned vegetables and soups jumped from 64,000,000 cases to 183,000,000 cases. In the same time, canned fruits went from 21,500,000 cases to 51,000,000 cases. Canned fruit and vegetable juices, not available in 1929, now total 29,250,000 cases.

In contrast, wheat flour consumption has declined drastically during the 20-year period.

Among meat products, the most startling increases have occurred in the consumption of chicken and turkey. Chicken consumption, totalling 329,500,000 lb. in 1929, soared to 427,000,000 lb. in 1939. Turkey consumption rose even more steeply, from 31,400,000 lb. in 1929 to 112,000,000 lb. ten years later.

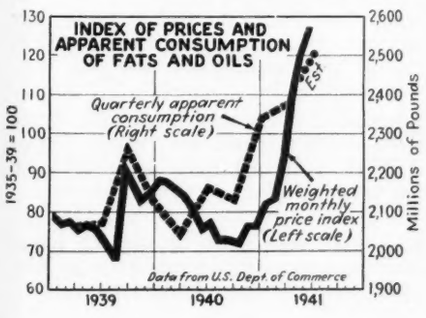
Other foods to show marked increases in per capita use include chocolate, cocoa, soft drinks, potato chips, peanut butter, cheese and sausage.

## Stored Foods Increase

STOCKS OF FOODS in public refrigerated warehouses were about 5 percent higher on July 1 than a year ago. Sixty-one percent of the 130 million cu. ft. of cooler and freezer space is occupied.

Comparison with quantities on hand July 1 a year ago revealed the following changes.

| | |
|---|---|
| Frozen Fruits | off 1½ million pounds. |
| Frozen Vegetables | up 4 million pounds. |
| Frozen Meat | up 124½ million pounds. |
| Frozen Eggs | up 28 million pounds. |
| Shell Eggs | off 1 million cases. |
| Cheese | up 27½ million pounds. |
| Butter | up 39¼ million pounds. |
| Lard | up 61 million pounds. |




## Feed Prospects Good

ACCORDING to the Bureau of Agricultural Economics, feed supplies for farm animals, including corn, oats, barley and hay, will be the largest in recent years, during the 1940-1941 crop year. Combined supplies of these four feeds are expected to exceed 126,000,000 tons, 3 percent over supplies in the preceding year and the largest amount in 15 years. However, feed-consuming farm animal numbers are expected to increase by at least 5 percent, making the supply per animal somewhat smaller this year than last.

As supplies of feed last year were abundant and relatively low-priced, the prospect for this year is for ample feed supplies, even with the increase in animals.

## Huge Crops Reported

WITH ESTIMATES that the 1941 wheat crop would be one of the largest in the history of the United States, the August 11th release of the Crop Reporting Board indicated that all staple food crops would have high yields this year.

A harvest of about 951,000,000 bu. of wheat is expected, made up of 266,000,000 bu. of spring wheat and 685,000,000 bu. of winter wheat. This total would constitute the third largest wheat crop recorded, being exceeded only in 1915 and 1919.

Corn also is expected to be available in huge quantity, with an estimate of a 2,588,000,000 bu. crop this year, compared to 2,449,000,000 bu. in 1940. Production of oats and rye are well up to normal, while barley production, forecast at 346,000,000 bu., is high.

Soybean expectations in bushels were not given, but the condition of the crop was reported at 88 percent of normal, compared to 79 percent at the same time in 1940 and to an average of 76 percent over the past ten years.

Vegetable crops for canning are reported as averaging about 17 percent over 1940 figures. Sweet corn for canning is placed at 1,138,800 tons, compared to 727,500 tons in 1940, while tomatoes are indicated at 2,387,000 tons compared to 2,274,700 tons last year, the previous high record.

## Foods Reach New Highs

WITH PRICE CEILINGS clamped on only scattered products such as sugar, and with continued bullish action by the Congressional farm bloc, speculation in food commodities ran wild in the month from mid-July to mid-August. Prices of most food products have reached or surpassed former high marks. Parity prices, of which so much was heard in recent years, were left behind.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and farm pressure groups began to push for 110 or 120 percent of parity. *The New York Journal of Commerce's* weekly index of general commodity prices reached 93.5 on August 16, 1941, compared to 92.6 on July 19 (1927-1929 average=100). The same publications index for grains, in the same period, rose from 75.1 to 81.5 and for foods from 87.6 to 87.8.

Spot prices for individual food commodities continued to jump in the four weeks from July 19th to August 16th. Wheat, No. 2 dark winter, rose from 95c to $1.05½. Flour went from $5.95 to $6.30. Corn, No. 3 yellow, increased from 72½c. to 74c. Beef increased from 17c. to 17½c., while lamb dropped from 20½c. to 20c. and pork loins fell from 25c. to 23c. Lard also dropped, from $10.45 to $10.15. Eggs reached a peak, going up to 28c. from 26¾c. on the earlier date. Butter upped 1c., from 34½c. to 35½c. Cheese increased from 23½c. to 24c. Among imported foods, coffee rose from 12¼c. to 13¼c., cocoa rose from $7.66 to $7.75 and sugar hit a Federal ceiling at $3.50. Canned tomatoes were unchanged, but canned peaches upped from $1.70 to $1.80 and canned salmon soared, going from $2.85 to $3.35.

# INDICATORS

FISHERY PRODUCTS held in cold storage in the United States on July 15, 1941, totaled 73,922,000 lb., compared to 55,117,000 lb. on June 15, 1941; to 62,062,000 lb. on July 15, 1940; and to an average of 62,118,000 lb. for July 15th, in 1936-1940.

SUGAR DELIVERIES, January-June, 1941, inclusive, were 3,995,114 short tons, raw value, compared to 3,076,975 tons for the corresponding 1940 period.

FLOUR PRODUCTION in July, 1941, by mills accounting for 65 percent of United States production, according to *The Northwestern Miller*, totaled 5,767,262 bbl. compared to 5,623,488 bbl. in July 1940.

COCOA IMPORTS into the United States, January 1 to August 15, 1941, were 3,789,758 bags, the largest on record for a like period and compared to 2,864,043 bags in the corresponding weeks of 1940.

EVAPORATED MILK PRODUCTION in June, 1941, was estimated by AMS at 334,168,000 lb., the largest June output on record. For the first six months of 1941 production is estimated to be 12 percent over that of the same months of 1940.

CONDENSED MILK PRODUCTION, January to June, 1941, was reported by AMS at 52,418,000 lb., 120 percent over production in the first six months of last year.

BEAN, dry, edible, production in 1941 is forecast at 18,728,000 bags, the largest crop in 30 years, and comparing to 16,074,000 bags in 1940.

RED SOUR PITTED CHERRY PACK in 1941 totaled 2,042,614 actual cases, compared to 3,422,873 cases last year.

MEAT CONSUMPTION, per capita, in the United States in 1940 is reported by the Department of Commerce to have been 140.6 lb. The figure in 1939 was 131.7 lb. and the 1935-1939 average was 126 pounds.

MILK, fluid, sold in June, 1941, was 6½ percent over the quantity sold in June, 1940, according to Milk Industry Foundation.

EGGS began to arrive in New York from Argentina during August, indicating that the domestic price level has reached a point attractive to foreign shippers.

CHICKENS on farms on August 1, 1941, numbered about 13 percent more than a year previous to that date.

EGG PRODUCTION in June was 0.3 percent over June, 1940, while in the first six months of this year egg production was 3 percent over the output for the corresponding months of 1940.

OLEOMARGARINE SALES in June, 1941, as indicated by sales of internal revenue stamps, were 24,372,742 lb., compared to 16,812,066 lb. in June, 1940.

OLEOMARGINE SALES, first six months of 1941, totaled 180,044,564 lb., compared to 157,185,562 lb. for the corresponding period of last year.

BUTTER, creamery, produced in June, 1941, was 214,735,000 lb., 4.5 percent above production in June, 1940; but slightly less than the May, 1940, output.

BUTTER, creamery, produced in the first six months of 1941 was 1,010,805,000 lb., 6.8 percent greater than the 1940 January-June production.

CHEESE, American, produced in June, 1941, totaled 83,145,000 lb., 10.1 percent above production in June, 1940.

CHEESE, American, produced in the January-June period of 1941, was 330,610,000 lb., 12.4 percent above production in the corresponding six months last year.

TEA IMPORTS in July, 1941, were 12,294,890 lb., the highest total for any month in recent years. For the first seven months of 1941, tea imports totaled 63,763,879 lb., compared to 58,700,347 for a like period in 1940.

VEGETABLES, dehydrated, produced in 1940, reached a total of 4,865,227 lb., according to the U. S. Department of Commerce.

PICKLE ACREAGE in 1941 is expected to total almost 125,000 acres, compared to 106,020 acres in 1940 and to a 1930–1939 average of 88,130 acres.

STORAGE CAPACITY available in the U. S. for grain, beans and flaxseed totaled 1,505,943,000 bu. on March 1, 1941, according to the U. S. Department of Agriculture.

FRUITS, frozen, in storage on August 1, 1941, totaled 172,666,000 lb., compared to 150,965,000 lb. on August 1, 1940, and to an average of 127,566,000 lb. in 1936-1940 for the same date.

VEGETABLES, frozen, in storage on August 1, 1941, totaled 71,308,000 lb., compared to 71,935,000 lb. one year before.

BUTTER, creamery, in storage on August 1, 1941, was 178,526,000 lb., compared to 123,628,000 lb. a year before and to 137,838,000 lb., the average for the date in 1936-1940.

CHEESE, all kinds, in storage on August 1, 1941, amounted to 167,736,000 lb. The figure on August 1, 1940, was 138,904,000 lb. and the average for the date was 121,540,000 lb. in 1936-1940.

EGGS, case equivalent, in storage August 1, 1941, totaled 12,219,000 cases, compared to 12,211,000 cases a year before and to an average for August 1 in 1936-1940 of 11,551,000 cases.

POULTRY, all kinds, in frozen storage on August 1 of this year amounted to 81,132,000 lb. The figure a year previous was 82,415,000 lb., and the average for the date was 63,846,000 lb. in 1936-1940.

MEAT, all kinds, in cure and frozen storage on August 1, 1941, totaled 761,289,000 lb., compared to 671,285,000 lb. one year before and to an August 1 average in 1936-1940 of 566,998,000 lb.

LARD IN STORAGE, August 1, 1941, was 334,499,000 lb., and rendered pork fat on the same date totaled 7,279,000 lb. The combined figure for these two products on August 1, 1940, was 303,208,000 lb. and the average August 1, figure in 1936-1940 was 168,137,000 lb.

WEEKLY WHOLESALE FOOD PRICE INDEX of Dun & Bradstreet on August 12, 1941, was reported at $3.21, the highest figure since October, 1929, and comparing to $2.24 for the corresponding date last year.

BUSINESS ACTIVITY INDEX of Business Week stood at 158.1 for the week ending August 9, 1941, compared to a figure of 158.6 one month before.

COST OF LIVING INDEX of National Industrial Conference Board was 88.9 in July, 1941, compared with 88.5 in June.

# LETTERS TO THE EDITOR

## Serves You Right!

To the Editor
of FOOD INDUSTRIES:

Please extend our deepest sympathy to your "gullible friend" (mentioned on page 27, August issue of FOOD INDUSTRIES) and tell him it serves him right.—W. FLOYD KEEPERS, *Director, Education Division, Wheat Flour Institute, Chicago, Ill.*

## Vanillin from Clove Oil

To the Editor
of FOOD INDUSTRIES:

It is a good thing that you did not make a wager.

In the "Hors d'Oeuvres" section of the May issue, you are willing to bet that vanillin cannot be produced from clove oil.

A 95 percent yield of vanillin can be obtained by oxidizing eugenol with air and ultraviolet rays, simultaneously at 50 to 60 deg. C. Clove oil is known to contain approximately 90 percent of eugenol.

W. J. Bush & Co. produces vanillin from clove oil, though their method of production may be different.—FABIAN SUNBERG, *Chemist, Charms Co., Jersey City, N. J.*

EDITOR'S NOTE: Many thanks for putting us right on our knowledge of organic chemistry.

## Bouquet for Authors Of Vitamin Symposium

To the Editor
of FOOD INDUSTRIES:

A few days ago I had the pleasure of receiving the June copy of your important magazine to which I have been a subscriber for many years.

I wish to express my sincere congratulations for your initiative in publishing scientific research articles such as that on vitamins, based on the studies of important men of science in that branch.

I am making public my congratulations by means of this letter and wish to advise that I would like to get in touch with the authors of the paper to whom I ask you to please convey my humble opinion. — GERMAN GRANDA VASQUEZ DE VELASCO, *Chief Engineer of the Municipal Laboratories of Lima, Departamento Municipal de Sanidad, Paseo Colon, Lima, Peru.*

## Distress Apples—Boards of Health Take Notice

To the Editor
of FOOD INDUSTRIES:

It is a pleasure indeed for me, as a subscriber, to congratulate you on the appearance of your August issue. The composition is more lucid and the publication is full of articles of high value and current interest.

In your own editorial on page 27, the second paragraph, dealing with the so-called "distress apples," certainly caught our eye. If the form of criticism of this cancer on the body of the apple-canning industry would assume some more constructive proportion than merely a casual adverse comment on the part of a visitor to the city, it would render valuable service to the industry. Unfortunately, the visitor to whom you refer may not have been acquainted with the fact that in almost every large Eastern city this type of so-called "distress apple" is being developed into a chief source of supply for local bakers, with the public totally ignorant of these facts, and the municipal authorities figuratively turning their heads away.

Some day something shall be done to protect the legitimate apple-canning industry, but in the meantime interested publications should raise their voices on this subject from just a gentle murmur to a loud roar of indignation.—ARTHUR S. BIER, *Sales Manager, Eastern Division, S & W Fine Foods, Inc.*

## Good Apples Are Used

To the Editor
of FOOD INDUSTRIES:

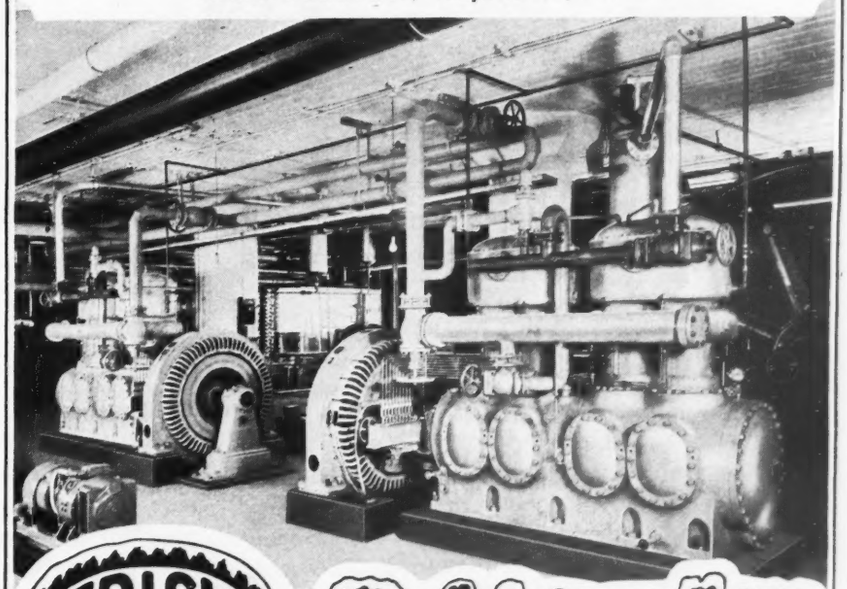
Your editorial in the August issue gives the casual reader the impression that the fresh sliced apple business uses off-grade and spoiled fruit as its raw material.

As you may know the furnishing of fresh sliced apples to bakeries has been a thriving business for the last decade.

In our own case we buy a good quality growers' grade of fruit that in most cases will pass U. S. No. 1 and is of a fine enough quality to keep well in cold storage from October to September.—D. P. TURNER, *Quality Apple Products Co., Cleveland, Ohio.*


To meet today's production problems you need the better cooling that goes with improved refrigerating equipment. Frick Refrigerating machines now save up to ⅓rd in power cost on low-temperature work: give much greater capacity in less space, and with less attention, than older types. Let us send you the full facts and figures. Write to

FRICK COMPANY, Waynesboro, Penna.



TRADE FRICK MARK Refrigeration

# Our Young Hopeful turned out to be a riot!

**CARTON BUYERS POSITIVELY OVERWHELMED US WITH BOOKINGS FOR *COATED* LITHWITE**

You will perhaps remember just eight months ago we announced *Coated* Lithwite—the revolutionary new boxboard, made by a revolutionary new high-speed, straight-through process.

When we introduced this board, we had an idea it would get a pretty good reception—for *Coated* Lithwite had a quality look and feel, a printing surface that was highly receptive to inks, a coating that took a tight, sure seal. And in addition to all these advantages, *the price was mighty attractive!*

Well, you know what happened. Carton buyers went for *Coated* Lithwite in a bigger way than we ever dreamed of. Orders and *repeat orders* poured in and piled up to a point where we just can't begin to supply the demand.

So, for the present, we can't give the usual service and deliveries on *Coated* Lithwite—but you may be sure that we are doing everything possible to remedy the situation.

GARDNER-RICHARDSON — FROM PULP TO FINISHED PRODUCT — ENGINEERED PRECISION

## The GARDNER-RICHARDSON Co.

**Manufacturers of Folding Cartons and Boxboard**

**MIDDLETOWN, OHIO**

# MEN · JOBS · COMPANIES

## INDUSTRY

**Arkansas State Rice Milling Co.** is completing construction of a warehouse in Carlisle, Ark., to have a capacity of 350,000 bu., bringing the company's storage capacity to 500,000 bu.

**Armour & Co. and Wilson & Co.,** Chicago, have both raised the wages of employees in their packing plants, establishing a 72.5-cent hourly minimum for male workers at Chicago. Armour's decision affects 20,000 workers in 15 plants, while the Wilson increase will reach 15,000 employees at eight plants.

**Best Foods, Inc.,** is making a $10,000 addition to its Chicago plant, the expansion involving principally the oil refining facilities.

**Borden Co.,** New York, has awarded contracts for construction of a $50,000 milk plant in Corsicana, Tex. The company has recently purchased the properties of Capitol Dairies, Inc., at Indianapolis, Ind.

**Crozet (Va.) Cold Storage Corp.** has constructed a $35,000 quick freezing plant which contains a chilling room, aging room and 300 lockers. Three rooms are also being added to the cold storage plant, in a general expansion move.

**J. H. Erbrich Food Products Co.** and Goody-Goody Food Products Co., allied food concerns of Indianapolis, recently suffered damages of $60,000 in a fire of undetermined origin. Both companies manufacture salad dressing, peanut butter, pickles and vinegar.

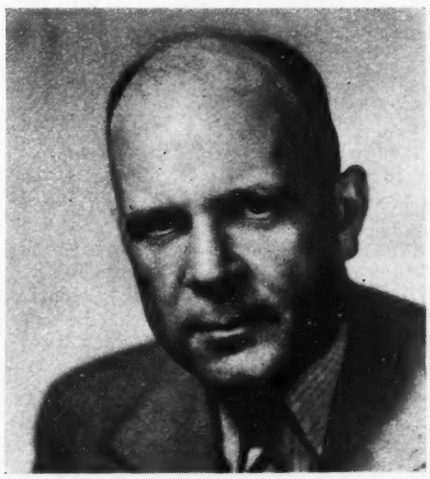
**T. L. Lay Packing Co.,** Knoxville, Tenn., is building a two-story addition to its plant, a $25,000 structure which will house the sausage, curing and bacon slicing departments.

**L. P. Maggioni & Co.,** will soon begin operation of its newly purchased vegetable canning plant at Thunderbolt, Ga., formerly owned by Lowden Corp.

**Maine Sea Food Co.,** Yarmouth, Me., has begun operation of the largest and most modern clam shucking plant in Maine, turning out several hundred gallons of clams daily. The company plans to establish five similar plants along the Maine coast during the next two years.

**Morning Milk Co.,** Salt Lake City, which operates plants at Wellsville, Utah, and Stockton, Calif., is building a new $250,000 milk plant in Sunnyside, Wash.

**Morten Packing Co.,** chicken products packer of Louisville, Ky., has completed a plant expansion program inaugurated last year with the purchase of two buildings in the city. The company is now in full production, with 24,000 sq. ft. of floor space, tiled sanitary kitchens, new automatic equipment and a capacity of 350,000 chickens per year.



**HARRY McNEILLY**

**Borden & Co., New York, has created a Vitamin Products Division headed by Mr. McNeilly, industrial engineer and former vice-president of Scott & Bowne Vitamin Corp. The company will manufacture and sell certain vitamins, particularly vitamin A and vitamin D, derived from natural sources, for food fortification.**

**WALTER R. BARRY**

**W. R. Barry, Minneapolis, for the past 12 years vice-president of General Mills in charge of grocery products operations, has been elected director to fill the vacancy caused by the resignation of Thomas C. Thatcher. Twelve other directors were re-elected, maintaining the directorate at 13.**

**Pa-Poya Corp.,** Coral Gables, Fla., has recently moved into a new building equipped with stainless steel machinery, where it is processing "Pa-Poya", sirup, a pulp and juice product for bottlers, and "Tendameat," made from papaya enzyme.

**Potter (Neb.) Milling Corp.** has been formed with Carl L. Jacobson as president and manager, with $25,000 capitalization in 2,500 shares.

**Standard Brands, Inc.,** plans to build a $45,000 yeast unit in Dallas, Tex.

**Stokely Bros. & Co.,** Indianapolis, Ind., has started sweet corn canning at its 5,000 acre plant at Peru, Ind., where the largest pea pack in the plant's history was recently canned.

**Streitmann Biscuit Co.,** Mariamont, Ohio, has purchased one of the largest air conditioning and refrigeration systems ever installed in a bakery, consisting of a 150-ton Carrier centrifugal machine. Streitmann is a division of United Biscuit Co.

**Virginia Food Stores Co-operatives Inc.,** has been chartered in Richmond, Va., with a maximum capital of $50,000 to conduct a manufacturing, agricultural and merchandizing business.

**Western Turkey Packing Co.,** Modesto, Calif., will award contracts for construction of a $50,000 one-story packing plant at Fresno, Calif.

**George Weston, Ltd.'s,** Salamanca, N. Y., baking plant, has received a U. S. Army order for 1,500,000 ration tins containing biscuits, coffee, sugar and confections.

## PERSONNEL

**Anthony D. Bordeaux,** southeastern sales representative of the Widlar division of Standard Brands, Inc., at Dallas, has retired from active service after 40 years in the canning and pickling industries.

**Thomas Brack,** manager of the Providence, R. I., plant of Ward Baking Co., has been transferred to the company's office. He has been succeeded at Providence by F. E. Wolfe.

**C. W. Daniels** and **W. F. Daniels** are opening a new bottling plant in Hawkinsville, Fla., remodeling a building and equipping it with a plate glass front.

**Charles Demko,** Altoona, Fla., has been re-elected president of Florida Grape Growers Association, which will convene in Eustis next summer.

First of all, you need a container that is sanitary—easy to clean and keep clean. Then, it must be durable—able to stand up under exceptionally hard use. Hackney *Seamless* Steel Containers meet those requirements. They're cold-drawn to shape—not a weld or joint in their entire construction. The bottom is reinforced with a wearing ring. For long life, appearance, and cleanability, they head the list. Food product manufacturers are using them for holding foodstuff, liquids, chemicals, ice, etc., as well as for food scraps . . . for inter-department handling of raw products during manufacturing processes.

**IN ALL POPULAR SIZES**

Your plant, too, can benefit by using Hackney Seamless Steel Containers. All popular sizes are available—5 to 60 gallon capacity, galvanized, tinned or black. Write for full details today.

Hackney
MILWAUKEE

**PRESSED STEEL TANK COMPANY**

1349 Vanderbilt Concourse Bldg., New York
208 So. LaSalle St., Room 1573, Chicago
669 Roosevelt Bldg., Los Angeles
1457 So 66th St., Milwaukee

*Containers for Gases, Liquids and Solids*


**R. E. Freeman,** Lake Wales, Fla., and his associates will build a citrus canning plant between Vero Beach and Fort Pierce, Fla. The plant is scheduled to begin operation by the start of the 1941-1942 season.

**E. M. Harmon,** formerly connected with the U. S. Department of Agriculture as marketing specialist, has now taken over the office of director of public relations, National Dairy Council.

**Paul L. Herrick** has been named director of purchases for the grocery division, C. D. Kenny Co., Baltimore, Md.

**Eric H. Hutchinson,** formerly technical director of Wahl-Henius Institute, Chicago, and master brewer with the Eldorado Brewing Co., Stockton, Calif., has become master brewer at George Muehlebach Brewing Co., Kansas City, Mo.

**Gordon M. Ibbotson,** former midwestern district manager for Wheatena Corp., is now associated with the Harley F. Jones Co., Chicago, Manufacturers' Representatives.

**C. R. Johnson** has resigned as president and director of the Wolverine Coffee Co. His successor has not yet been appointed.

**Herman F. Kraybill,** formerly graduate research fellow, University of Maryland, is now research chemist in the dairy department, Swift & Co. Research Laboratories, Chicago, Ill.

**Robert A. Merchant** has been appointed general manager of General Seafoods', Gloucester, Mass., plant. He is succeeded as manager of the production division, Boston Fish Pier, by Ben Morahan.

**H. F. Puetger,** formerly chief chemist for Quaker Maid Co., Brooklyn, N. Y., has accepted the position of technical director for Chapman and Smith Co., Chicago.

**E. J. Quinn,** general sales manager of Commander Milling Co., Minneapolis, has been elected vice-president of the company.

**B. G. Reck,** formerly with Hathaway Bakeries, has been appointed assistant to the president of Michigan Bakeries, Inc. J. L. Thompson will become comptroller of the organization.

**Arthur F. Schulz,** formerly with E. R. Squibb & Sons, has been named president of Vitamins Plus, Inc. John C. Bird is vice-president of the new organization.

**S. Lee Tannenholz** has been named assistant to the president of the Rodney Milling Co., with headquarters in Boston. J. A. Powers succeeds him as Pittsburgh representative.

**Desmond C. Wray** has been appointed Lynchburg, Va., branch manager of National Biscuit Co. Phillip H. Jones is new manager of the Providence, R. I., branch, and Frank Johnson becomes New Bedford branch manager for the company.

ALDEN C. SMITH

**Alden C. Smith, Shiocton (Wis.) Kraut Co., was elected president of National Kraut Packers Association, succeeding Lon P. Flanigan, Seneca Kraut & Pickle Co. The new vice-president is John Stroup, Empire State Pickling Co., Phelps, N. Y.**

# DEATHS

**William A. Burnett, Sr.,** 68, manager of Nashville (Tenn.), Union Stockyards for 23 years, Aug. 16, in Monteagle, Tenn.

**George S. Foltz,** founder and operator of the Foltz Flour Mill, Salem, Ohio, Aug. 2, in Salem.

**Stanley Herbert Freihofer,** 47, president of William Freihofer Baking Co. and vice-president of the parent concern, Freihofer Baking Co., July 30, in Atlantic City, N. J.

**G. A. Harris,** 63, an executive of Planters Nut and Chocolate Co., Suffolk, Va., Aug. 17, at Suffolk.

**Charles H. Koerber,** 53, vice-president of the Koerber Brewing Co., Toledo, Ohio, July 30, in Toledo. He had been associated with Grand Valley Brewing Co., Ionia, Mich., and with Michigan Brewing Co., Detroit, prior to organizing Koerber Brewing Co.

**Carl J. Martin,** 61, vice-president of Michigan Elevator Exchange, Lansing, Mich., July 15 in Coldwater, Mich.

**Arthur L. Norris,** 78, president of Norris, Inc., Atlanta, Ga., candy manufacturers, July 27, in Atlanta.

**Clarence T. Parks,** of the research department of American Can Co., Aug. 12. He was in charge of the branch laboratory at Portland, Me., which was devoted to problems connected with the sardine cannery.

**Raymond R. Sinclair,** 49, in charge of the Medina, N. Y., branch of H. J. Heinz Co., Aug. 8, in Medina.

**M. Strikowsky,** 65, president of the Pepsi-Cola Bottling Co., Canton, Ohio, Aug. 4, in Canton.

**Louis H. Sutton,** 66, former vice-president of Wheat's Ice Cream Co., Buffalo, N. Y., Aug. 11, in Akron, N. Y. He was identified with the ice cream business for 32 years.

## ASSOCIATED INDUSTRIES

**American Can Co.** is constructing a $90,000 addition to its Tampa, Fla., plant, to increase packing and shipping facilities.

**Anchor Hocking Glass Corp.** has moved its closure equipment facilities from Long Island City, N. Y., to Connellsville, Pa., where a larger plant permits expansion of production.

**Bethlehem Steel Co.,** in cooperation with OPM, will construct a 780,000-ton high speed plate and an open hearth furnace at its Sparrows Point, Md., plant, for national defense orders.

**Food Machinery Corp.,** Peerless Pump Division, has completed a modern plant at Canton, Ohio, moving offices and manufacturing facilities from Massillon, Ohio, to the new location.

**Jessop Steel Co.,** Washington, Pa., has begun construction of a new 84-in. two-stand plate mill, housed in an extension of the company's sheet mill building, as part of a large plant expansion and modernization program.

**Lyon Iron Works,** Greene, N. Y., manufacturers of materials handling equipment, has changed its name to Lyon-Raymond Corp., continuing under the management of George G. Raymond.

**National Can Corp.** has announced establishment of a research department at Baltimore, Md., consisting of field service, chemical, development and inspection divisions. The company recently purchased the Noblesville (Ind.) Canning Co. and several acres of ground where the plant is located.

**National Oil Products Co.,** Harrison, N. J., will erect a new plant in Richmond, Calif., to produce vitamin-fortified oils and concentrates. The unit will include laboratories for technical research and control.

**Pulverizing Machinery Co.,** Roselle Park, N. J., manufacturers of the "Mikro" pulverizer, have let a building contract for a new factory and office building, 100 x 200 ft., at Summit, N. J.

*..Helps You Meet Required Standards on Govt. Orders*

Whatever you pack . . . tomatoes, peaches, dairy products, meat or seafood items . . . Government Orders require certain quality standards. Since proper sanitation procedures are so essential in safeguarding product quality against bacterial contamination and spoilage, play SAFE by using TESTED Oakite cleaning and germicidal materials.

Notice the big difference . . . the greatly improved results . . . the time and effort saved . . . the economy . . . you get! That is because the emulsifying action and fast wetting-out properties of Oakite materials thoroughly, speedily remove fats, juices, vegetable particles, syrup and other accumulations.

Then treat processing equipment with Oakite Bactericide. Its MORE ACTIVE form of available chlorine assures FASTER, MORE CERTAIN bacteria-killing action . . . provides EXTRA protection against contaminating organisms . . . helps you CONTROL QUALITY more easily!

**FREE Booklets Give Details**

Write today for FREE booklets giving successful, low-cost cleaning and germicidal methods and formulas based on the effective work these time-tested Oakite materials are doing in food plants the Nation over.

**OAKITE** *Tested* **CLEANING** FOR QUALITY CONTROL

Complete Nation-Wide Service For These Industries

- MEAT PACKING
- CANNED FRUIT
- FROZEN FOODS
- SAUCES & SOUPS
- CANNED FISH
- MACARONI
- CONFECTIONERY
- SPICES & CONDIMENTS
- CEREAL PRODUCTS

Manufactured only by

**OAKITE PRODUCTS, INC., 26G THAMES ST., NEW YORK, N. Y.**

Representatives in All Principal Cities of the United States and Canada

## Color in Foods

*(Continued from page 44)*

*ment, procedures for color control, or any other significant aspect of this important subject.*

**References**

1. See Food Industries, July, 1939, page 381, and September, 1939, page 497, for the two standards mentioned. Many other color plates have also been published.

2. See Bureau of Standards Research Paper No. 1239, titled "Method of Designating Color," by Judd and Kelly, published in September, 1939. A uniform system of describing colors is outlined in that paper, with relation to the well-known Munsell color charts.

3. Two of the most recent are papers on artificial daylight studies by Miss Dorothy Nickerson, color technologist, U. S. Department of Agriculture, Washington, D. C. See *Trans. Ill. Eng. Soc.* 34, 1233, 1939; and *Engineering* 36, 373, 1941.

4. For additional sources of information on color see "Symposium on Spectrophotometry in the Pulp & Paper Industries," published in *Technical Association Papers* 23, 473-525, 1940, and *Paper Trade Journal* 111 Sept. and Oct. issues, 1940; also see National Paint, Varnish, and Lacquer Association's Laboratory Manual, chapter titled "Color Systems, Colorimeters, and Spectrophotometers"; and for photoelectric cell and circuit characteristics and an extensive bibliography see "Photoelectric Methods in Analytical Chemistry," by Ralph H. Miller, *Ind. & Eng. Chem.*, Analytical Edition, 11, 1, 1939.

**Would you believe it**

**...SHE'S LOOKIN' FOR A NEEDLE IN A HAYSTACK!**

**She wouldn't have so much trouble finding it if she'd go to the *right* place to look!**

● When you need a certain specific type of stainless steel fitting, you'd save time if you'd address your letters to TRI-CLOVER MACHINE COMPANY, Kenosha, Wisconsin—TRI-CLOVER offers the *only complete line* of Stainless Steel, Trialloy and Nickel-plated Bronze Sanitary Fittings and Pumps. A wide selection is kept in stock at all times!

When you plan to install new equipment or build a new plant . . . remember, the lack of one fitting can delay the whole installation . . . and greatly increase the cost of the work.

So, order your Stainless Steel Sanitary Fittings and Pumps from *one source*—which carries your standard needs in stock.

TRI-CLOVER Engineers are constantly developing and perfecting new and exclusive types of specialized fittings and pumps. These will be added to the wide selection already stocked.

Try TRI-CLOVER "THE *Complete* LINE"

**TRI-CLOVER MACHINE COMPANY**

**KENOSHA WISCONSIN**

*Write for name of nearest jobber*

PIONEER MANUFACTURERS OF STAINLESS STEEL FITTINGS AND PUMPS

## Food Demand

*(Continued from page 63)*

If the large exports in view are made, it is certain that American civilians will go short of at least some kinds of canned fish—most likely, salmon and sardines.

Eggs, in dried and frozen form, are expected to be among the foods shipped abroad in greatest quantity. Particularly, dried eggs are suitable for this purpose. Two facts are likely to make possible large shipments of eggs without much reduction in the American civilian's egg supply. Most important, farmers are feeding their laying flocks most liberally, making particular use of the large surplus stocks of corn in Mr. Wallace's "ever-normal granary." And also, under the defense set-up, somewhat fewer eggs are needed to supply American demands.

It may be that egg drying capacity in the United States is not sufficient to meet this increased demand, in spite of the fact that the industry has been growing in recent years. If this is so, it is probable that the industry could be rapidly expanded, with the aid of OPM priorities.

Next in our tables are beans and nuts. Nuts are of little importance in this matter of lend-lease food supplies, but beans, both dried and canned baked, are already in demand. Stocks of dried beans are large, good crops are likely, and canners, apparently, have the capacity to can the product, using their equipment at times when other raw materials are not available. There does not seem much likelihood of shortage for this product.

The final group of foods that enters the lend-lease and defense picture is edible fats and oils. All belligerent countries except Russia and China are chronically short of these products and on an import basis. In contrast, the United States has a surplus of the edible fats and oils, though it generally must import some oils for soap and paint manufacture. This year, however, with a short cotton crop and fewer soybeans than last year, vegetable oil supplies may be somewhat restricted. Also, lard and butter are likely to be exported in quantity under lend-lease operations. It is likely, in view of these facts, that the vegetable oils and fats supply will be somewhat smaller than usual and that civilian supplies of these products will be somewhat curtailed.

Summing up, lend-lease and defense demands upon the food supply are likely to restrict the quantities of certain foods available for American civilians. There will be ample food, in both quantity and variety, but supplies of some items will be below normal and prices consequently will be higher.

# NEW PACKAGES & PRODUCTS

## Two New "Standard" Brands

The latest products to be distributed nationally under the well-known label of Standard Brands, Inc., are Fleischmann's "Enriched Hi-$B_1$ Yeast" and "Royal Tapioca Pudding" in "orange coconut" flavor.

In the U. S. nutritional program, the enriched white bread recommended by the Committee on Food and Nutrition of the National Research Council contains additional amounts of thiamin, nicotinic acid and iron. And to meet this need, the Hi-$B_1$ yeast was developed at the Fleischmann Laboratories in New York by Dr. Charles N. Frey and his associates.

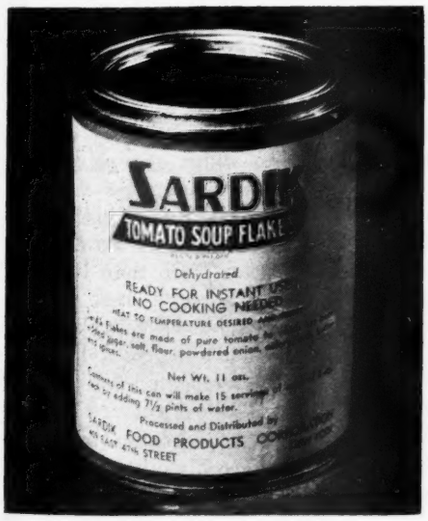
The new yeast contains 30,000 International Units of vitamin $B_1$ per pound and the amount of nicotinic acid and iron needed to produce the recommended loaf of white bread. Enriched white bread made with this yeast is no different in taste or appearance from the usual white loaf.

The new tapioca pudding was developed by Standard Brands because of increased demand for time and labor saving desserts. It is an orange coconut variation on the "Royal Tapioca" theme, consisting of a tapioca base with orange flavor blended with bland coconut, which is finely ground to give soft and smooth consistency. It can be served as it is, or as a sauce for crushed fruits.

SERVICE
FLEISCHMANN'S
Enriched Hi-B₁
YEAST
This Seal denotes that Fleischmann's Enriched Hi-B₁ Yeast and the claims made for it stand accepted by the Council on Foods of the American Medical Association.

## Tomato Soup Powder

Tomato soup in the form of flakes is the latest quick dried product to be introduced by Sardik Food Products Corp., New York. An 11-oz. can of these tomato flakes will make 15 servings of soup of 8 oz. each. And the soup is ready to be served when the flakes are mixed into boiling water. The flakes are said to be rich in vitamin C. In addition to tomatoes, the product contains sugar, salt, flour, powdered onion, celery, milk, butter and spices. It is packaged in a can sealed with a tight-fitting friction-type closure.




The foods now dehydrated by the Sardik drum drying method (Food Industries, December, 1939, page 699) include four soups, three fruits and pumpkin flakes. These dehydrated foods are at present figuring prominently in shipment-to-Britain displays.

## We Have Banana Flakes

With consumer interest focused on high-vitamin foods, the spotlight falls on banana flakes, introduced after several years of experiment by Penna Soya Products Co., Inc., Williamsport, Pa.

These flakes contain vitamins A, B, C and G; phosphorous, calcium, magnesium, potassium, sodium and iron; and calories in the amount of 1,680 per pound, Penna Soya reports. As the product contains no preservatives or added oils, it can be used wherever the fruit would be used—with cereals, in cookies, pastries or puddings, and as an addition to milk drinks.

## Mushroom-Salt Seasoning

From Seattle comes a new product, "Cultured Mushroom Salt," invented by A. T. Lelles and commercially produced by Cultured Mushroom Industries, Inc. The company has contracts with growers who supply the mushrooms in a dried state, and upon arrival at the Seattle plant they are subjected to further dehydration. Machines for grinding the dried product had to be designed and built locally before high-speed production could be obtained, as the ground mushrooms are lighter than air and the usual blower equipment could not be applied.

Twelve tablespoonfuls of Cultured Mushroom Salt equal 1 lb. of fresh cultured mushrooms. The concentrate, which is made from finely ground dried mushrooms seasoned with salt and cornstarch, can be used in either cooked or uncooked foods.

*PATAPAR BOIL-PROOF GREASE-RESISTING
*DURAPAK PARCHMENTIZED CELLULOSE STRONG WHEN WET

# Patapar NEWS

*PARCHKIN THE EXQUISITE ART PARCHMENT
*PATAWITE 9 lb. MANIFOLD THIN AND STRONG
* REG. U. S. PAT. OFF.

NO. 82 Paterson Parchment Paper Company SEPTEMBER, 1941 Bristol, Pennsylvania

## Have you ever thought of paper?

In many fields executives are today looking for substitutes to meet the rising costs and scarcity of certain materials. Are *you* looking? And have you ever thought of *paper?*

Patapar Vegetable Parchment possesses qualities not generally connected with paper. It's insoluble—resists grease—has no odor—is tasteless—can even be boiled! In food industries it has solved packaging problems for over fifty-five years. In hospitals it is replacing oiled silk for covering wet dressings. In hundreds of unexpected places it is proving its usefulness.

And so we say, consider Patapar and its unique qualities. Perhaps you have a problem it will help solve.

**Maybe Patapar can do it**

Write us, *outlining the application you have in mind* so that we can send you sample sheets in the size, weight, and finish recommended for your need.

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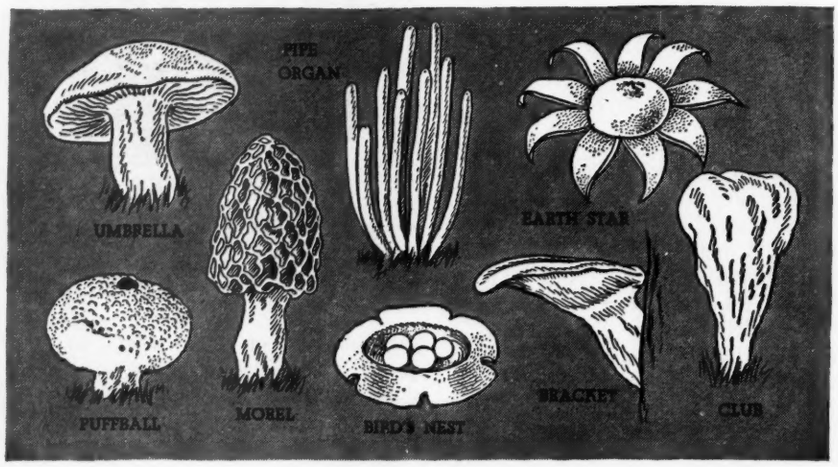
Bristol, Pennsylvania
*West Coast Plant: 340 Bryant St., San Francisco*
*Branch Offices: New York, Chicago*
Headquarters for Vegetable Parchment since 1885




# Mushrooms

Early in September, mushrooms of the field and woods are in their prime. Fungi differ from other plants by having no chlorophyll, and no flowers and seeds. Lacking the pigment by which a green plant, with the aid of sunlight, makes food out of water and the carbon dioxide from the air, mushrooms must live on food left by other plants in humus, fallen leaves, or wood. Instead of seeds, mushrooms reproduce with naked, short-lived cells called spores. These are microscopic in size but often may be seen as dust. We like to think of Nature as efficient, but in this matter of spore production her prodigality is enormous. A ripe mushroom may manufacture spores and throw them out at the rate of 40 million per hour. A good-sized puffball can make spores at a much greater rate. Only an infinitely small number of these spores ever germinates.

The mushrooms that we see are simply towers to lift spore-making machinery above the ground where spores can be caught and scattered by the wind. The spore mechanism of the common mushrooms looks like countless fingers (microscopic, of course), from the tip ends of which the spores are pinched out one after another from four little projections.

The vegetative part of the mushroom is buried in its nutrient medium and resembles a bit of white cotton thread. All fungi look alike in this respect. It is the sporing structures that make mushrooms especially vivid and interesting.

The umbrella form is the most familiar, but mushrooms may take many whimsical forms in a variety of soft hues and brilliant colors. One of the most interesting is the bird's nest fungus. The spores in this type are enclosed in little "eggs." In one species of this, gas is formed under the eggs and when the spores are ripe, a tiny explosion pops the spore case out of the nest.

Mushrooms are one of man's most historic and delicious foods. They are rich in proteins. Juvenal, historian of ancient Rome, said that the Lybians could plow under their corn and unyoke their oxen if they would only keep sending him mushrooms.

One should not gather wild mushrooms for cooking and eating without expert knowledge as to which are poisonous. The production of mushrooms for the market is an important industry. Chester County, Pennsylvania, produces 25 million pounds a year, more than half of America's annual supply. These mushrooms are raised under scientifically controlled conditions, not from volatile spores, but from chopped-up bits of the thread-like vegetative structure which the mushroom farmer calls "spawn." This insures no contamination from poisonous species.

# FOOD EQUIPMENT NEWS

## All-Purpose Lift Truck

TOWMOTOR CO., 1228 East 152nd St., Cleveland, Ohio, has introduced a new all-purpose factory high lift truck, Model LT-44, of greater capacity than the Model LT-40. The new truck is powered by a 27½ hp. gasoline motor, can lift 4,000 lb. at 15 in. from the carriage, has a 44-in. wheelbase and a turning radius of 72-in. Speeds are from 1 to 10 miles per hour. Lifting and tilting are accomplished by a hydraulic mechanism. Lifts are up to 11 ft. at a rate of approximately 40 ft. per minute.

**All-purpose gasoline lift truck of 4,000 lb. capacity.**

## New Packing

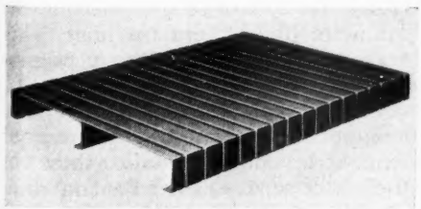
GREENE, TWEED & CO., 101 Park Ave., New York City, have brought out Palmetto Spiral Asbestos Packing, a high pressure packing in which the outer layer is impregnated with lubricants forced into the packing by a special hot process. The packing is said to have a rugged and resilient construction to withstand any misalignment and impact shocks, together with effective and lasting lubrication to reduce wear on the rod or shaft and to prolong the life of the packing. This packing is designed for use for reciprocating rods and plungers of steam engines and pumps, air and gas compressors, and various special machinery. It is regularly furnished in standard 12½ ft. spirals.

## Single-Faced Steel Pallet

UNION METAL MANUFACTURING CO., Canton, Ohio, has developed a new design of lightweight steel pallet for such purposes as freight handling between manufacturer and customer. These are used as a returnable pallet, in place of wood pallets now discarded, the return freight being less than the cost of a new wood pallet.

Top deck and legs of this pallet are formed in one piece, with channel spacer supports depending in number upon width and load of pallet. Double-faced pallets can be furnished by the addition of a slatted or solid bottom deck.

The pallets are suitable for use with hand pallet or power fork trucks.



**Lightweight steel returnable pallet for freight handling.**

## Bean Slicer

FOOD MACHINERY CORP., Hoopeston, Ill., has brought out a new bean slicer that slices the beans lengthwise, French style. This is an entirely automatic machine, with capacity up to 2,000 lb. of beans per hour. Long life is claimed for the machine, as the cutting knives slice against a roller with a replaceable face and do not contact or cut into the conveyor belt.

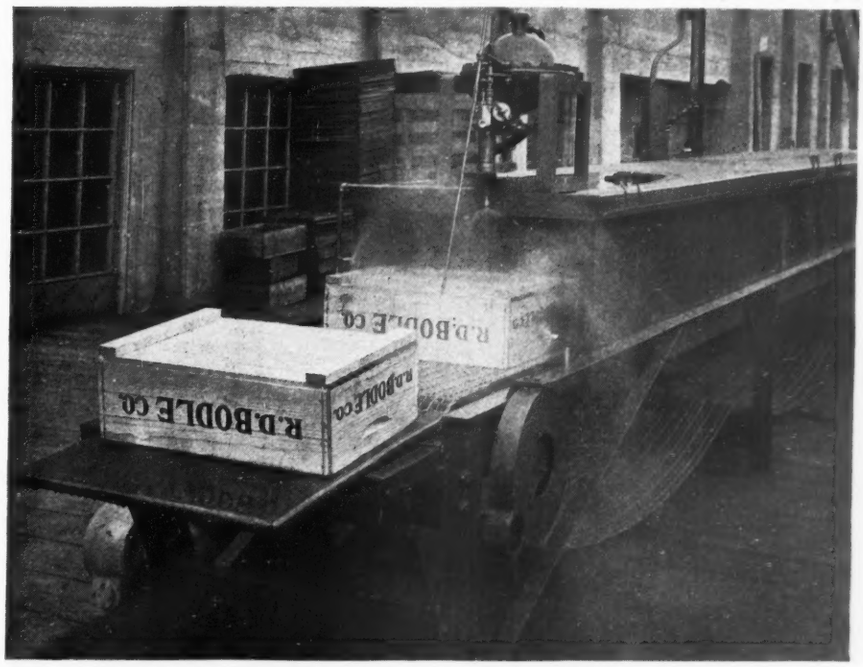
## Compound for Preventing Condensation Drip

J. W. MORTELL CO., Kankakee, Ill., has developed a spray-on plastic compound for the purpose of eliminating condensation drip. Called "Insulmat No. 595", this compound is self-bonding and requires no priming coat, adhesives or support. It is for application to any metal surface, where it is said to form a coating protective against corrosion as well as eliminating condensation drip. The compound, containing specially treated cork particles, is said by the manufacturer to be odorless and suitable for use in food plants and warehouses.

## Lug Box Sterilizer

CASCADE SPRAYER CO., 3215 Western Ave., Seattle, Wash., has developed the "Cascade Lug Box Adapter," a device for the control of bacteria, molds, yeasts and odors in the lug boxes, trays, crates and other processing containers used in the fruit, vegetable, meat and other food industries.

This device is attached to the discharge end of the lug box washer. It serves to spray the outside and inside




**Device for spraying washed lug boxes with sterlizing solution.**

surfaces of the washed lug boxes with "Casklor" solution, a sodium hypochlorite spray.

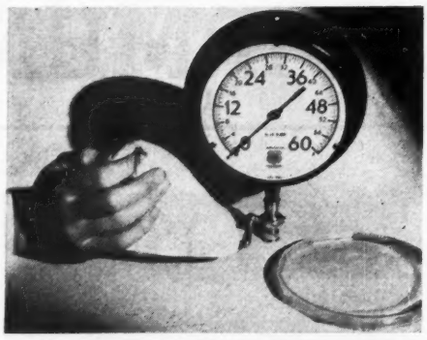
## Rotary Pump

Blackmer Pump Co., Grand Rapids, Mich., has developed a new general purpose rotary pump. Tested on liquids from naphtha to molasses, the pump is also available with removable liners for corrosive or abrasive fluids. Liquids of high viscosity have been provided for by streamlining the inlet chamber.

Using the Blackmer "Bucket" design, this pump is said to have higher efficiency, quieter operation and longer bucket life than previous models. It is available as single or twin pumps with single reduction gear drive, or as a single pump direct-connected to gearhead motor, or for flat belt drive. Capacity is rated at 50 gal. per minute at 460 r.p.m. Connections are 2 in., both inlet and outlet.

## Valve Positioner

Moore Products Co., 3629 North Lawrence St., Philadelphia, Pa., has developed a valve positioner for diaphragm-operated valves that provides for the optional use of a bypass valve, which is made as an interchangeable part of the unit. A heavy calibrated loading spring, in addition to operating the pilot bellows, acts to take up any backlash in the lever connections. Adjustments for valve strokes of from ½ to 2½ in., and for setting zero, are easily accessible and can be made without interrupting the control process. By turning the bypass from "Positioner" to "Instrument," the positioner can be completely removed without interrupting the service.




Plastic dial for gages can be washed.

This positioner is so designed that a linear relationship always exists between the instrument air pressure and the actual valve motion. The bellows and stainless steel pilot are a self-contained unit, made without any levers to introduce friction and cause hysteresis errors.

Tests have shown a sensitivity of 0.2 percent for full scale instrument pressure change. Speed of operation is said to be about eleven seconds for full travel on an average 1 in. stroke valve.

## Instrument Chart of Plastic

Permochart Co., 456 Chestnut Road, Sewickley, Pa., has developed a recording instrument chart of vinylite plastic made for continuous re-use. When using this chart, the previous day's record can be removed from its surface with a damp cloth. The maker claims that these new charts will not curl, are non-inflammable, and are resistant to oil, gasoline and grease. With their use, it is said that chart costs are reduced by 80 percent or more.

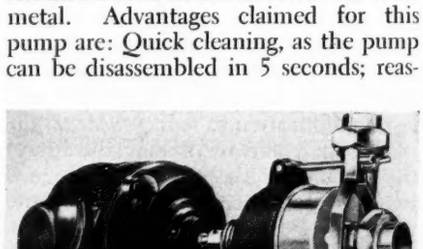
For applications where it is necessary to save chart records, this company has developed a microfilm photographic system for recording and filing. According to the manufacturer, this method reduces filing space by 98 percent of that normally required, and a cost analysis shows that in plants where 100 charts per day are used, a saving of 23 percent resulted.

## Plastic Gage Dials

Gages Made By Ashcroft Gauge Division, Manning, Maxwell & Moore, Inc., Bridgeport, Conn., are now being equipped with "Duradial" plastic dials in place of aluminum or brass. These dials are said to be superior to the metal dials, in that they can be easily washed or cleaned, as shown in the illustration. Also, the dials will not corrode. The dials are made of two plastic layers, with the graduations sealed between.

## Food Liquids Pump

R. G. Wright Co., Inc., 2934 Main St., Buffalo, N. Y., has brought out a stainless steel pump especially designed for handling liquid food products or ingredients. It is constructed of polished stainless steel, so that the liquid handled comes in contact with no other metal. Advantages claimed for this pump are: Quick cleaning, as the pump can be disassembled in 5 seconds; reassembly after cleaning as quick as disassembly; spring coupling that eliminates need of packing glands or oil lubrication. The pump outlet can be directed at any desired angle. This pump will be available in four sizes.

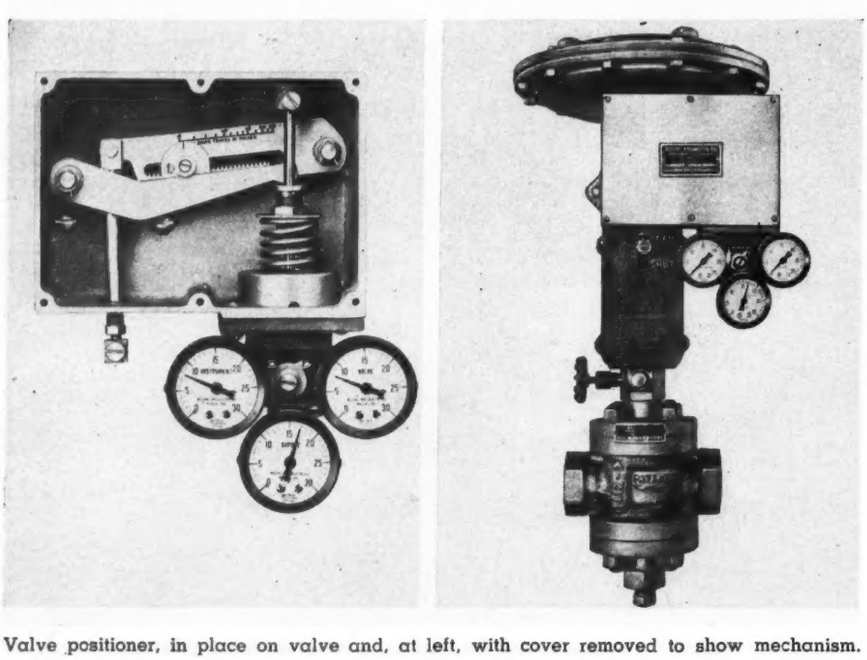


Stainless steel pump for food liquids.

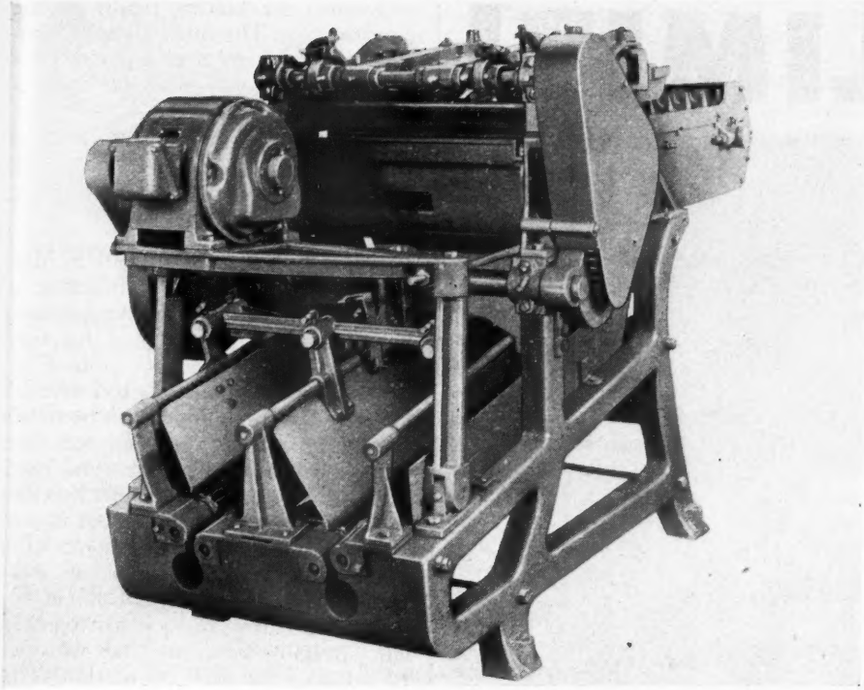
## Double Husker for Corn

Food Machinery Corporation, Hoopeston, Ill., is making a Double Husker for corn with a capacity up to 2 tons of husked corn per hour. This machine is said to embody a new principle that prevents bruising or mutilation of the corn, not only satisfying the husking requirements of packers of cream-style corn, but also those of packers of small Golden Bantam corn-on-the-cob.

In this husker, the four husking rolls are made of spirally-grooved, semi-hard



Valve positioner, in place on valve and, at left, with cover removed to show mechanism.



Double Husker for corn canners.

rubber. Each roller is divided into three sections, which can be interchanged to provide even distribution of wear. The hopper has vibrating sides and partitions, to prevent any tendency of the ears to bunch up or clog the machine. The machine also has an improved husk loosening mechanism and a butting device which aligns the ears properly with the butting knives.

## Lubricants in Tubes

FISKE BROS. REFINING CO., 120 Lockwood St., Newark, N. J., is packaging three of its "Lubriplate" lubricants in collapsible tubes. These tubes are fitted with an 1-in. extended nozzle to fit filler openings in gear cases, ball bearings, etc. The lubricants are: Ball bearing "Lubriplate" for all types of ball and roller bearings up to speeds of 5,000 r.p.m. and temperatures of 340 deg. F.; No. 310, for gear cases of small tools and equipment; and No. 105.

## Lighting Fixture

RELIANCE DEVICES CO., INC., 140 Liberty St., New York has brought out a lighting fixture called the "Swivelier." It consists of a swiveling light socket that can be swung so that the light points in almost any direction, being rotatable through a 360 deg. full circle and adjustable to any angle. This socket connects to a current source by means of a short tube, within which is the wiring. The end of the tube is equipped with a box plate, or a screw-in-adapter, or is threaded to attach to another arm or object.

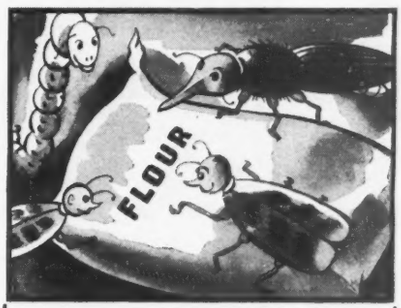
## Trolley Conveyor Switch

AN AIR OPERATED SWITCH has been developed by Cleveland Tramrail Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio, for use on cab-operated, gravity or automatic dispatch overhead trolley conveying systems. The purpose of this development is to enable the tramrail operator to pre-set the switch at some distance ahead while traveling in order that he may lose no time. Likewise, indexes on gravity or automatic dispatch carriers may be set to actuate trippers which will cause one or several switches to take the positions desired.

The device consists of two main assemblies, an outer supporting frame and an inner sliding frame. The outer frame

Swiveling lighting fixture.


# CONTROL THOSE PESTS!




**FLOUR moths, weevils, worms and other pests are among the costly nuisances and profit-stealers in food processing. Unless controlled they can be the cause for complaints, returned goods and loss of consumer good will.**

**Control pests by thorough fumigation with properly applied HCN gas. Call on your local Pest Control Operator. Talk over your pest problem with him and let him show you his plans for effective control. You will find that a well planned fumigation program carried out by expert and experienced Pest Control Operators may save you future expense and worry that will make it worth many times its original cost.**

**We have a book containing interesting information about pests and their control by fumigation. Just drop us a line on your letterhead and we will be glad to send you a copy. No obligation, of course.**

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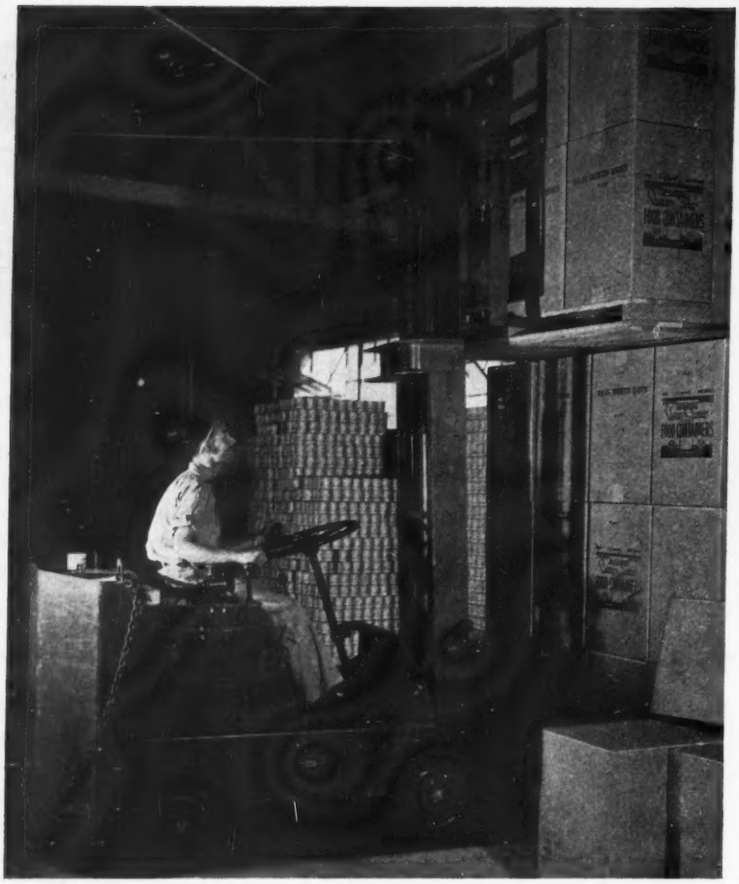
CYANEGG
AN ECONOMICAL SOURCE
OF HCN FUMIGATING GAS

# The SKYLIGHT'S the LIMIT!



Towmotor

## INCREASES STORAGE CAPACITY

**By stacking up . . . up . . . up to 25 feet high, Towmotor increases usable storage space, makes available more room *when* you need it.**

**That's just *one* practical reason Towmotor deserves careful consideration in planning future materials handling.**

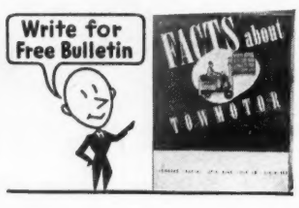
**Others include Towmotor's ability to handle 1,000 to 10,000 lb. loads in *units* . . . moving load *units* quickly through doorways, narrow aisles, up ramps . . . working 24 hours a day . . . spotting loads when and where necessary to keep materials moving efficiently.**

**TOWMOTOR adds up to less manual handling, reduced costs, decreased spoilage, increased speed and expanded storage capacity. Such results are proving invaluable today. Tomorrow they will prove *indispensable.***

**The first step toward planning a Towmotor materials handling system is to get all the facts . . . learn how Towmotor can fit into your production picture. To do so, write for a copy of our free bulletin. Towmotor engineers are available to answer specific inquiries.**

**TOWMOTOR COMPANY** ***1268 E. 152nd Street, Cleveland, O.***

Let TOWMOTOR (CLEVELAND) take the load off your hands





is designed for bolting rigidly to the superstructure. The inner assembly, carrying a straight and a curved rail, rides on multiple rollers, and is set in position by an air cylinder.

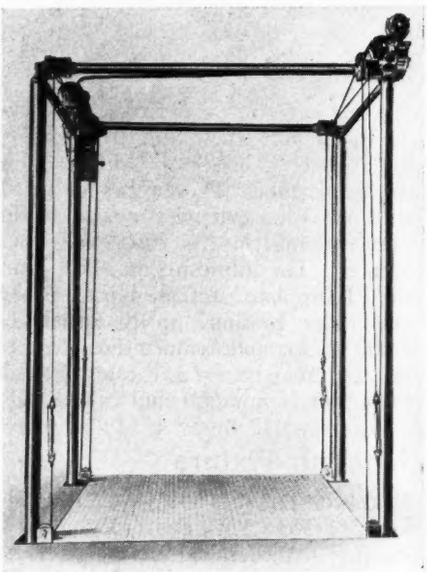
These switches can be furnished in all capacities up to 5 tons.

## Safety Floor Mat

WILLIAM F. KLEMP CO., 6601 S. Melvina Ave., Chicago, is distributing a new steel safety mat of the flexible nonskid type which is designed for easy cleaning. This mat is made from $\frac{3}{8}$ in. by 0.065 special analysis steel formed into a $1\frac{1}{4}$ x $1\frac{1}{4}$ in. mesh. It can be rolled up like a rug, but it is claimed that when unrolled it will lie flat and rigid and that it cannot creep or wrinkle. These mats can be furnished cut to any length up to 25 ft. in length, up to 6 ft. in width, and are supplied in multiples of these dimensions. Ends of adjacent mats can be joined together with stringing wire, only one wire being required for each connection. The mats have no rough sides, as all edges are turned and finished. Electro-galvanized mats can be supplied when specified.

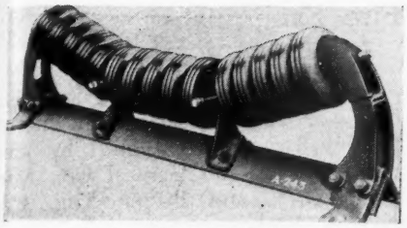
## Factory Lift

FOR ELEVATING or lowering loads up to 6 tons, Walker Mfg. Co. of Wisconsin, Racine, Wis., has brought out a simple factory lift, designed to allow the platform to be installed flush with the



Simple factory lift of 6-ton capacity.

factory floor when in low position. The device is simple to install, with motive power of the factory hoist type mounted on the top of the tubular frame work. This lift can be used to replace ramps for moving trucks from one level to another, with considerable resultant space saving.



Pneumatic carrier for belt conveyors.

## Pneumatic Belt Conveyor Carrier

STEPHENS-ADAMSON MFG. CO., Aurora, Ill., has introduced a pneumatic belt conveyor carrier. These carriers are designed for use under loading spouts and in belt feeders where the impact of heavy bulk loads subjects both the belt and carrier to abnormal strains and wear.

The rollers on these carriers are made up of a series of pneumatic rubber units, 6 in. in diameter. These rollers are mounted on the steel hubs in which bearings and shaft are housed. Roller units have wear-resisting treads and are inflated and permanently sealed to prevent loss of air. These carriers are designated "Style No. 711 Pneumatic Impact Carriers."

## Low-Lift Truck With Forks

ELWELL-PARKER ELECTRIC CO., Cleveland, Ohio has equipped its Model EP-6 low-lift industrial power truck with a special platform having removable forks that can be attached in two positions as shown in the accompanying photograph. When these forks are attached in low position, they are used to lift and transport loaded pallets from floor level. These same forks, in the high position, enable the truck to pick up and transport long skid loads on the truck platform.

## Carloading Method

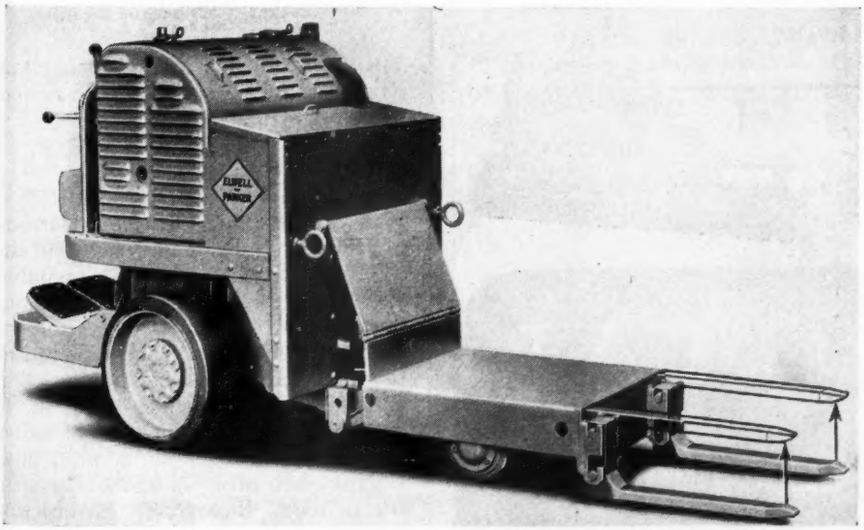
SIGNODE STEEL STRAPPING CO., 2600 N. Western Ave., Chicago, has developed a truck for use in their "bulk binding" carloading method. The purpose of this truck is to make faster and easier the job of transporting coils of steel straps and application tools to the point of operation. Features of the truck said to make possible savings in time and labor include: Coil cradles are adjustable for various widths of strapping and will accommodate three sizes at one time. Each size can be dispensed independently or any combination can be dispensed simultaneously. Coil cradles and cradle rollers are designed to reduce efforts required in dispensing strap and to eliminate possibility of backlash. Roller bearing, rubber-tired wheels are supplied for easy quiet operation.

## Emery Floor Material

WALTER MAGUIRE CO., INC., 330 West 42nd St., New York, is distributing "Cortland" emery aggregate for use in making long-wearing, non-slip floors for food plants and other plants, such as dairies, ice cream plants and meat packing establishments. Besides being of extreme hardness, the emery aggregate prevents slipping where materials spill on floors or on ramps or stairways.

Cortland aggregate is usually used in a top coat on concrete floors. Where only a non-slip topping is required, a $\frac{1}{4}$ in. coating is applied and well-worked into the ordinary concrete base. Floors subjected to extra hard wear should receive a coating $\frac{3}{4}$ to 1 in. in thickness.

This emery aggregate is said to be non-absorbent and to withstand steam, water, oils, soaps and most acids. Floors made with it can be cleaned without damage by scraping or steaming.



Low lift industrial truck equipped with removable forks.

**PRIZE WINNING QUALITY**

*Always!*

A golden stream of uniformly perfect chips—crisp, dry, tender and salted to the Queen's taste—hour after hour, day after day. That's the regular performance of a

**FERRY CONTINUOUS POTATO-CHIP MACHINE**

Starting from raw unpeeled potatoes every operation except inspection of the peeled potatoes is completely automatic and continuous . . . peeling, slicing, drying, frying, cooling and salting are all under "push button control"—And better yet, production costs are far lower than with other manufacturing methods . . . Made in 5 sizes with capacities from 50 to 350 lbs. of chips per hour . . . If you are in the potato chip business to make money it will pay you to get complete details of Ferry Machines today . . . Write for Bulletin.

*ALSO MAKERS OF:*
SLICERS & AUTOMATIC
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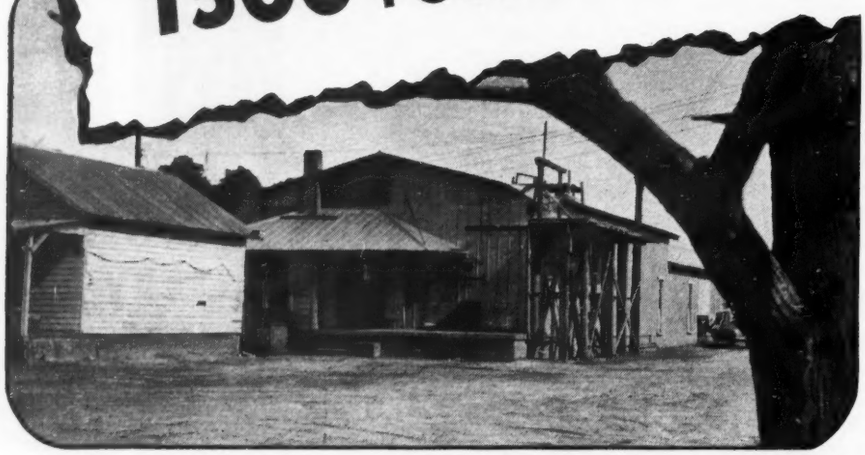
CAN WASHING MACHINERY

**J. D. FERRY CO.**
129 SO. CAMERON ST.
HARRISBURG, PA.

# 18½c WORTH OF FUEL MAKES 1500 POUNDS OF ICE!



One "Caterpillar" Diesel D11000 Engine supplies all power, day and night, for Columbus Ice & Fuel Co., Chadbourn, N. C., producing 16 tons of ice daily. Runs 2 compressors, a blower, pumps and agitators, all on 3½ gallons of 5¼c fuel per hour.

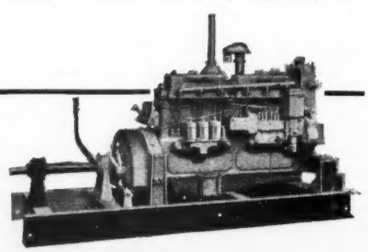
ARE YOU looking for ample power at a big saving in cost? Do you want a power-plant that will give you steady, trouble-free service for a long time to come? Then follow the example of the Columbus Ice & Fuel Co., of Chadbourn, North Carolina. They've cut the cost of ice production to rock-bottom with a "Caterpillar" Diesel Engine. And in more than 5000 hours of operation since it was installed, they say "the engine has not missed one lick!"

That's similar to the experience of hundreds of other users of "Caterpillar" Diesel Power. It's *economical*. And it's *dependable*.

"Caterpillar" Diesel Engines operate efficiently on low-grade fuel—such as No. 3 domestic burner oil. And the savings continue year after year because "Caterpillar" Diesels are built for long life and heavy duty. A typical feature of their construction is the "Hi-Electro" hardening used by "Caterpillar" to give cylinder-liners, crankshaft and other parts *more wear-resistance* than can be had with any other practical heat-treatment method.

Whatever kind of power you're using now, look into the probable savings an easy-to-buy, easy-to-install "Caterpillar" Diesel can give you! SEND FOR FREE LITERATURE.

CATERPILLAR TRACTOR CO., PEORIA, ILL.



• *"Caterpillar" Diesel Power is available to meet the specific requirements of your job. There are Diesel Engines from 34 to 190 maximum horsepower; Diesel Electric Sets from 15 to 90 kilowatts, continuous-duty rating.*

CATERPILLAR
REG. U.S. PAT. OFF.
DIESEL ENGINES AND ELECTRIC SETS


## Fire Extinguisher for Incendiaries

A fire extinguishing agent that puts out magnesium fires and incendiary bombs, has been developed by joint research of Dow Chemical Co., Midland, Mich. and Pyrene Mfg. Co., Newark, N. J.

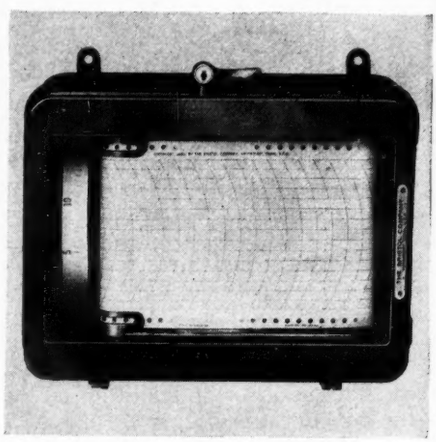
Known as Pyrene G-1 Fire Extinguisher Powder, the product is a dry inert compound that is said to stop metallic fires, as with magnesium, sodium, potassium, aluminum and zinc. It also contains a material which, when heated, forms a heavy, air-excluding, fire-smothering vapor.

In use, this extinguishing agent is applied to the fire by spreading with a scoop or shovel. Being non-abrasive, it may be used freely around machinery.

This fire extinguishing agent is being distributed by Pyrene Mfg. Co., 560 Belmont Ave., Newark, N. J.

## Strip-Chart Recorders

BRISTOL CO., WATERBURY, CONN., has brought out a new design of strip-chart recorders for pressure, temperature, level, flow, motion and electrical units.



New design of strip-chart recorder.

These instruments record on a 6-in. strip chart and can be used with remote recording systems.

## Agitator Drive

H. K. PORTER CO., INC., 4941 Harrison St., Pittsburgh, Pa., has brought out the "Portereducer," a drive for agitators and mixers. This drive employs a planetary system of reduction gearing, so that more teeth are in contact at any one time than with other systems. This is said to give smoother operation, to save space for a given amount of reduction and to give minimum tooth load for any given torsional effort. The gearing is helical throughout. Anti-friction bearings are used.

Another feature of the drive is that

Reduction drive for agitators or mixers.

it is designed to use standard NEMA frame motors, permitting the use of any make motors.

The design permits an unlimited ratio of reduction, with efficiency said to be 90 percent and greater. Size range is from ½ hp. to 50 hp.

## Food Plant Conveyor Belt

AVOIDANCE OF WOODEN or metal sideboards on food plant belt conveyors is the object of a belt recently introduced by United States Rubber Co., 1230 Sixth Ave., New York. This belt has side flanges with sloping inner surfaces to retain the food material on the belt.

Material used in the construction of the flanges insures maximum flexibility over pulleys, and permits permanent anchorage to the main belt. This development is called the "Vanner shaped flange" and is available in heights of ½ in., ⅝ in., ¾ in., and 1 in. on belts of standard widths.

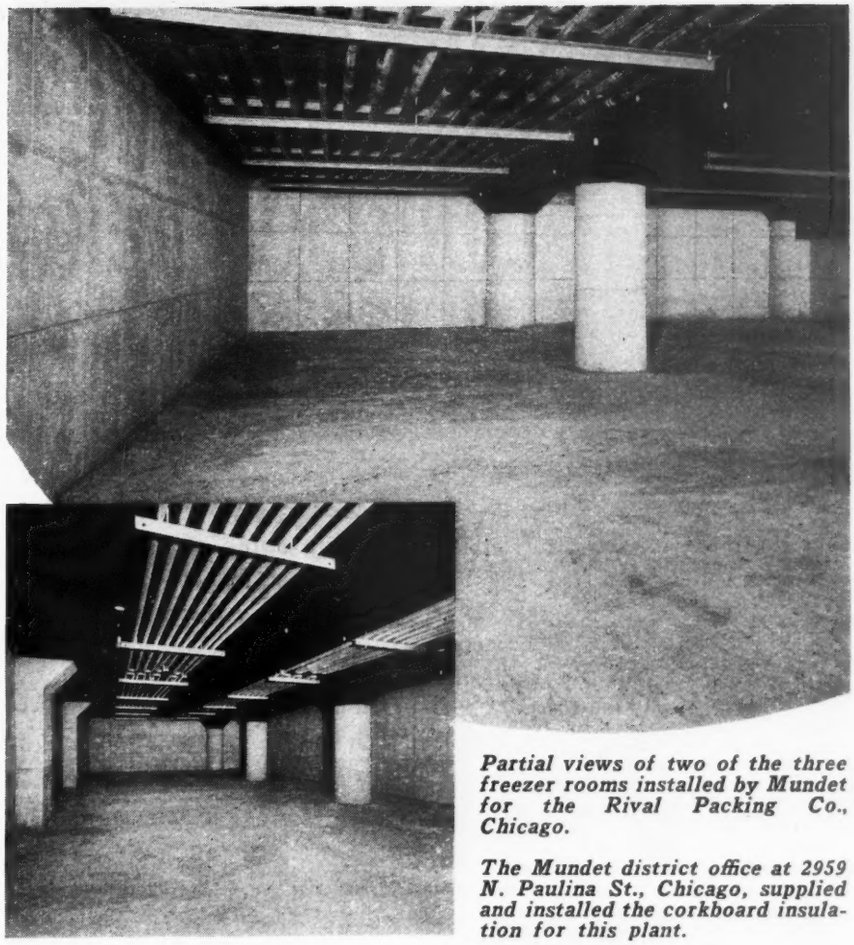
Advantages claimed for the belt are that it saves spilling of material, is more sanitary and is easier to clean than a flat belt with sideboards. It is also said to give better working conditions and better vision of the work.

## Electric Liquid Level Control

LUMENITE ELECTRIC CO., 407 South Dearborn St., Chicago, has developed the "Faratron" electronic liquid level control, a device for the control of the level of any food liquid in a tank or other container.

The control operates by means of one or more electrodes or antenna so placed in the tank as to govern the level. When the liquid makes contact or breaks contact with an antenna, the volume of electron emission in a standard high current amplifying tube is changed. This change activates a relay which opens or closes an electric load circuit controlling the pump or motor valve.

The control is available in two types:

*Partial views of two of the three freezer rooms installed by Mundet for the Rival Packing Co., Chicago.*

*The Mundet district office at 2959 N. Paulina St., Chicago, supplied and installed the corkboard insulation for this plant.*

# Economical Cold Storage

**These cold storage rooms are well prepared to conserve low temperature. Layers of Mundet Cork Insulation in the walls, columns and ceilings make possible the precise and economical control of cold. • In all low temperature operations, Mundet Cork Insulation is a dependable barrier to heat infiltration. Through its efficiency the problems of temperature control are simplified and costs of operation are reduced. • Responsible engineering services covering all phases of low temperature insulation are available through Mundet offices, located in principal cities. Recommendations and estimates are supplied promptly. For helpful data on low temperature insulation, cork specifications and heat loss charts, write to Mundet Cork Corporation, Insulation Division, 65 S. Eleventh St., Brooklyn, N. Y.**

MUNDET
CORK INSULATION

CONSERVES LOW TEMPERATURE

# Stop Costly Air Leaks

with

# LUNKENHEIMER

## AIR CONTROL DEVICES

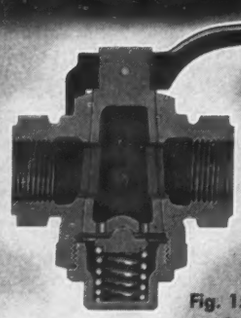
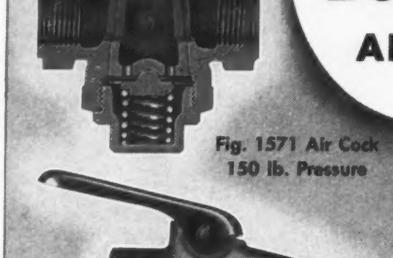


Fig. 1571 Air Cock
150 lb. Pressure

Air Nozzles
Non-Metallic Disc
Fig. 1840-PT, Hose End
Fig. 1841-PT, Pipe End
150 lb. Pressure



**Are you losing money because of leaks in your compressed air lines? Even a tiny leak the size of a pin hole may be stealing some of your profits—losses which can easily amount to a substantial sum at the end of a year.**

**You can stop these costly leaks with Lunkenheimer Air Control Devices. Included in the line are air cocks, air nozzles, globe, check and quick operating valves, and pop safety valves. They are a sure way to end air wastage and they'll pay their cost many times over in the savings they make.**

**For full information on the complete line of Lunkenheimer Air Devices send for copy of Catalog 78.**

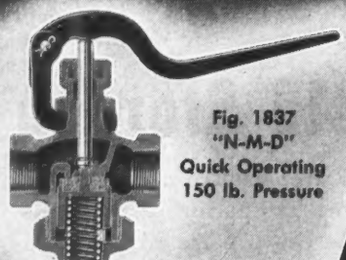


Fig. 1837
"N-M-D"
Quick Operating
150 lb. Pressure

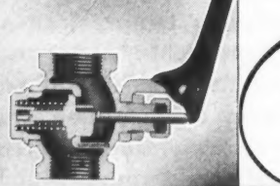


Fig. 635
Regrinding
Quick Operating
200 lb. Pressure

ESTABLISHED 1862
THE LUNKENHEIMER CO.
"QUALITY"
CINCINNATI, OHIO, U. S. A.
NEW YORK CHICAGO
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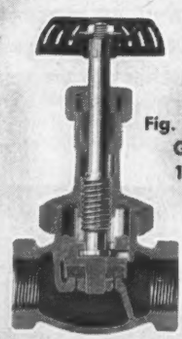


Fig. 123, "N-M-D"
Globe Valve
150 lb. S. P.

Pop Safety Valves
for Air
Fig. 1226, Top Outlet
5 to 250 lb. Pressure

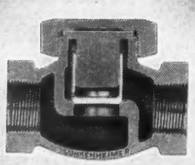
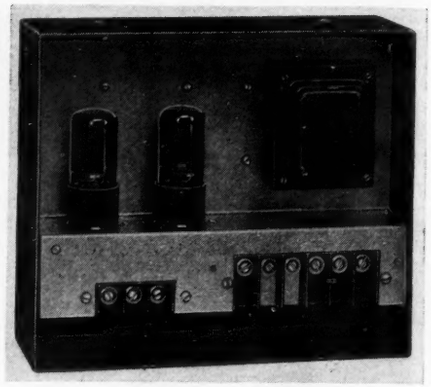


Fig. 1616
Air Compressor Check Valve
200 lb. Pressure

Buy from your local Lunkenheimer distributor! He is co-operating in every way to give you the kind of service you so vitally need for the National Defense Program.

Control box of a two circuit "Faratron" liquid level control.

One level control and two level control on a single circuit; and two level control on two circuits.

## Food Plant Packing

GREENE, TWEED & Co., 101 Park Ave., New York, is now making "Klero" packing in a form suitable for use with apparatus handling liquids that must be kept unstained or uncontaminated, particularly food plant liquids. This packing is pure white in color, and it is lubricated with a material that is odorless, tasteless, edible and resistant to chemical action. The packing itself is made of asbestos yarn and has a braid-over-braid construction to prevent accumulation of solid materials in the packing.

## Non-Slip Paint

AMERICAN ABRASIVE METALS Co., Irvington, N. J., is making "Fera-Flow" paint, a non-slip paint for floors in food plants and other places where the floors may become slippery. Applied in the ordinary way, by brush, this paint dries to give a wear-resisting granular surface that is designed to give safe footing under slippery conditions. The makers claim that it contains no sand, ground glass or similar grit. It is said to be easy to clean and not to be affected by scrubbing or ordinary washing compounds.

## Hydrolysis Research

(*Continued from page 56*)

zation at higher temperatures produces a quality product of uniform strength, low syneresis value and general attractiveness. It is understood that many varied adaptations of the process are possible.

**References**


1. G. L. Baker and M. W. Goodwin, *Food Industries*, August, 1941, page 45.
2. G. L. Baker, and R. R. Kneeland *Industrial & Engineering Chemistry* 28, 372, 1936.

# JUST OFF THE PRESS

## BOOKLETS • LITERATURE • BULLETINS

### FOOD PLANT EQUIPMENT

**Air Conditioning and Refrigeration**—Unit equipment for air conditioning and refrigeration, coolers, condensers, compressors and accessories are described in Bulletin WP-1099-B27, published by Worthington Pump and Machinery Corp., Harrison, N. J.

**Bar Wrapping Machine**—The "DF" wrapping machine, a quickly adjustable device for wrapping all sorts of candy bars at speeds up to 115 per minute, is described with specifications in an illustrated folder published by Package Machinery Co., Springfield, Mass.

**Dairy Cleansers**—"The Dairy Cleaning Handbook" is the title of a 24-page illustrated booklet, dealing with the use of a line of cleansers in various departments of dairy manufacture, published by Magnus Chemical Co., Inc., Garwood, N. J.

**Elevating Hand Trucks**—Various types of hand-operated elevating platform, or high-lift, industrial trucks are described with specifications in illustrated Bulletin No. 122, issued by Lyon Iron Works, 737 Madison St., Greene, N. Y.

**Filling Machine**—The "Vari-Visco" filling machine, a machine for high speed filling of viscous food products into such containers as cans and bottles, is described in four types in an illustrated folder published by Karl Kiefer Machine Co., Cincinnati, Ohio.

**Insect Killer**—A new type of mechanical bulk flour Entoleter, for destroying insect infestation in flour and other dry, finely divided food products, is described in a 4-page bulletin, Form No. 3994, published by Entoleter Division, Safety Car Heating and Lighting Co., 230 Park Ave., New York.

**Labeling Machine**—The "World" automatic "Bee-Line" straightaway labeler, a high capacity machine for labeling bottles, designed to give straight-line movement of containers, is described in a 4-page illustrated folder of Economic Machinery Co., Worcester, Mass.

**Materials Handling Equipment**—"Lo-Hed" hoisting equipment, from ¼ to 12 tons capacity, is described with specifications and application data, in Catalog H-40, a 28-page bulletin with blueprint illustrations, issued by American Engineering Co., Philadelphia, Pa.

**Oil Filters**—Filter presses for use in the processing of vegetable, animal and fish oils are discussed, with specifications in Bulletin No. 113, issued by T. Shriver & Co., Harrison, N. J.

**Package Conveyors**—Two pamphlets, showing photographs of package conveying systems in food plants, Form 341 and Form 441, have been issued by Lamson Corp., Syracuse, N. Y.

**Packing House Equipment**—Beef killing and packing equipment for meat packers is described and illustrated with pictures of installations in a publication of Cincinnati Butchers' Supply Co., Helen and Blade Sts., Cincinnati, Ohio.

### PLANT SUPPLIES

**Ammonia**—The properties and the safe handling of anhydrous ammonia, the common refrigerating medium, are discussed in a 16-page bulletin issued by Mathieson Alkali Works, Inc., 60 E. 42nd St., New York.

**Bearings**—A new type of pre-cast bearings, bronze on steel, is described in a 4-page illustrated bulletin issued by Johnson Bronze, New Castle, Pa.

**Feedwater Treatment**—The chemical analysis of boiler feedwater and the chemistry involved in feedwater treatments are summarized in a 12-page bulletin entitled "Feed Water Chemistry" published by Cochrane Corp., Philadelphia, Pa.

**Heating Cable**—Electric heating cable for such applications as warming tanks, valves and pipelines that carry viscous liquids, is described with application information in Bulletin GEA-3539 of General Electric Co., Schenectady, N. Y.

**High Vacuum Pumps**—Rotary-piston high vacuum pumps in capacities from 15 to 750 cu. ft. per minute, are described with specifications in Catalog No. 75 of Beach-Russ Co., 50 Church St., New York.

**Induction Motors**—The recently perfected line of "Tri-Clad" induction motors is described, with emphasis on the built-in protection, in Publication GEA-3580, General Electric Co, Schenectady, N. Y.

**Pumps**—Type S, single-stage, double-suction centrifugal pumps are discussed with application information and specifications, in a 40-page illustrated catalog No. B-6146, published by Allis-Chalmers Mfg. Co., Milwaukee, Wis.

**Repairing Cements**—Cements for use in making repairs to equipment and pipelines, for sealing cracks, for stopping leaks in apparatus and equipment, for patching floors and walls, and for waterproofing cellars and cisterns, are discussed with information as to their use in a new edition of the 40-page "Smooth-On-Handbook" issued by Smooth-On Manufacturing Co., 570 Communipaw Ave., Jersey City, N. J.

**Sight Glasses**—Five new sizes of sight glasses, ranging from ¾ in. to 2 in., for screwed connection fittings, for use in indicating flow in pipelines, are described in publication No. 2970, Cochrane Corporation, 17th and Allegheny Ave., Philadelphia, Pa.

**Valves and Accessories**—A 16-page illustrated catalog, describing and giving specifications for a complete line of valves, strainers and dryers for air conditioning and refrigeration service has been issued as Catalog No. 95 by Henry Valve Co., 1009 N. Spaulding Ave., Chicago.

**Variable Speed Drive**—"When to Use the Graham for the Variable Speed Drive" is the title of a bulletin No. 501, issued as a technical guide for variable speed transmission applications by Graham Transmissions, Inc., 2711 N. 13th St., Milwaukee, Wis.

### PACKAGING

**Container Linings**—Protective linings for steel drums and containers, in four different types, with application information for each type are discussed in a 12-page illustrated bulletin of Ault & Wiborg Corp., 75 Varick St., New York.

**Printed Wrappings**—"Transparent Wrappings and Methods of Printing Thereon" is the title of an 8-page booklet discussing various types of transparent wrapping sheets and the methods used in producing printed wrappers from them, published by Baker Gravure Co., Inc., 140 West 21st St. New York.

### LABORATORY EQUIPMENT

**Laboratory Equipment**—The Coleman Universal Spectrophotometer, an instrument for color testing, vitamin determination and spectrochemical analysis is described in Bulletin 204 of Wilkens-Anderson Co., 111 North Canal St., Chicago.

**Laboratory Materials**—A group of special products useful in bio-assays and other nutritional investigations is described in a booklet issued by Research Laboratories, S.M.A. Corp., Chagrin Falls, Ohio.

## MISCELLANEOUS

**Baker's Slide Rule**—For calculating ingredient quantities and checking costs, a baker's slide rule is now being distributed to bakers by Stein, Hall & Co., Inc., 285 Madison Ave., New York.

**Corrosion Protection**—"Tygon" corrosion-resistant tank linings and paints for processing equipment are described in Bulletin 1610 of the United States Stoneware Co., 60 East 42nd St., New York.

**Paint and Lighting**—"Facts About White Paint and Better Illumination" is the title of a 26-page illustrated booklet discussing industrial plant painting, issued by Sherwin-Williams Co, Cleveland, Ohio.

**Vitamins**—"Vitamin in Nutrition" is the tile of a 30-page booklet discussing the vitamins and existing knowledge of their part in nutrition, published by Merck & Co., Inc.

## TRUCKING

**Trucking Equipment**—A complete catalog, showing all types of trailer bodies for all sorts of uses, and giving specifications for these bodies, has been issued as a 40-page four-color publication by Fruehauf Trailer Co., Detroit, Mich.

## Dehydration

*(Continued from page 55)*

the "bugs" in the system and equipment, this pilot plant operation has produced enough material to make a thorough market test of the acceptance of dehydrated vegetables and fruits. Dry-Pack Corp. has also learned something here from the experience of the freezing industry and is not going directly after the consumer market.

Instead, it is going after the dehydrated-soup market. Packages are 5-gal. friction-top square tin cans, which can be filled by hand.

Of particular interest is the method of purchasing raw material, for this may have a bearing on the future of canning, if present indications are a criterion of the future. Raw peas, for example, were purchased from a canner located 60 miles away. This canner has gone in for freezing in a big way and employs a quality separator to scalp off the most tender peas for freezing. This operates on the principle that the more tender peas will float in a brine. (See Quality Separation by Differences of Density, FOOD INDUSTRIES **10**, 136, 1938). The sinkers, or less tender ones, heretofore have been put into cans by the normal canning operation. Dry-Pack Corp. has been purchasing the more tender of the sinkers, thus leaving only the least tender to go into the cans.

Thus for some vegetables, the No. 1 or fancy quality has gone into the frozen pack and No. 2 or choice quality has gone into the dehydrated pack, leaving No. 3 or standard quality to go into cans. Admittedly, this division of the raw material is an economic experiment in which both the canner and dehydrator have been learning how to make the most of their respective operations. Yet even with the added cost of the seemingly wasteful operation of trucking blanched peas in large containers for 60 miles to the dehydrating plant, the venture appeared profitable after one season's trial—profitable for both the dehydrator and canner.

The company's experience in 1939 and 1940 was the basis for a large-scale plant located in San Jose, Calif., erected in 1941. In the East, large-scale operations have begun this year at Lyons, N. Y. Although the pilot plant at Sodus, N. Y., has been abandoned, the firm of Skinner and Eddy, makers of "Minute Man" dehydrated soup mixes from Dry-Pack vegetables, continues in operation at Sodus.

## Imitation Flavors

*(Continued from page 61)*

manufacturer must also be prominently displayed on the label.

### *Ingredients That May Be Used*

With regard to the use of solvents other than alcohol, the government has very definitely placed the responsibility for their use on the shoulders of the food manufacturer. There are several possible organic products which, in theory, might be used, but until extended studies have been conducted into all phases of their toxicities the flavor manufacturer should *leave them strictly alone!* The government does, however, recognize that glycerine is a safe and normal constituent of flavor products. Its use as a solvent is attractive in light of the increasing cost of alcohol.

Glycerine not only acts as a solvent, but gives the product "body" and lowers its freezing point. When used in sufficient quantity (the amount being dependent upon the protection required), loss due to container breakage by freezing may be practically eliminated. Another interesting and important property is that a dilute glycerine solution of vanillin produces upon cooling quite a staple super-saturated condition. This means that in the absence of glycerine the vanillin would crystallize out and form a sediment in the bottle which might be difficult to redissolve. In the presence of glycerine, however, the product stays clear even though the theoretical solubility at the temperature is exceeded. This property is of interest to manufacturers who ship their products to northern states during winter months.

In the manufacture of an imitation vanilla flavor high-grade materials must be used. The vanillin should contain no off-odors and should pass all tests, particularly as to melting point. Chemically pure glycerine should be used—lower grades are high in heavy-metal content. The caramel should be of high tinctorial strength and yield a brilliantly clear solution upon dilution. The quality of the water used is often neglected. Hard waters should be softened by appropriate means, and all waters should be filtered, preferably through a sand-activated carbon unit.

The actual amounts of the various ingredients to be used may be varied considerably. The minimum amount of vanillin that may be used has been established at 0.7 percent. However, in actual practice it is well to somewhat exceed this amount. A good figure for an average single strength product is 1¼ oz. of vanillin per gallon of finished flavor. Glycerine to the extent of 15 to 20 percent should be employed, and the finished product should be colored to match the shade of pure vanilla extract; the amount of caramel required is about ½ oz. per gallon. Solution of the vanillin is easily effected by heating the glycerine to be used and then dissolving the vanillin in this hot glycerine. Water and a trace of caramel are then added to bring the product up to the finished volume. If pure vanilla is to be added, at least 8 oz. should be contained in each finished gallon. Other flavoring substances may be employed to produce special effects, but their use should be adopted only after careful experimentation.

For reasons already discussed there is going to be an ever-increasing demand for imitation vanilla flavors. Requirements as to the quality of these imitation flavors are bound to be higher. The answer to this situation is the use of first-quality materials, the use of proper quantities of flavoring substances, the use of legal informatory labels and the establishment of fair selling prices. It is high time that imitation vanillas be raised from their present all-too-frequent status of "gyp" products to the level of honest, legitimate flavors.

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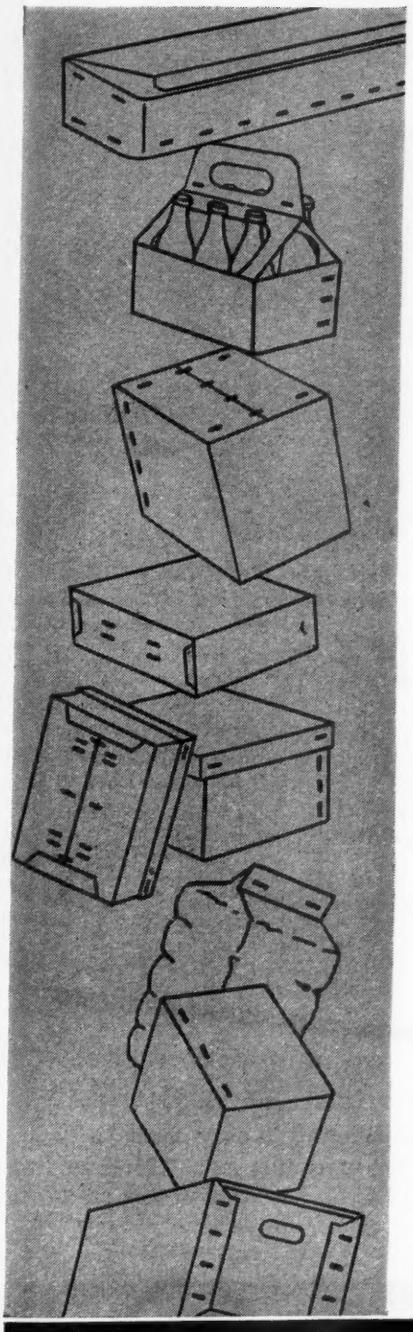
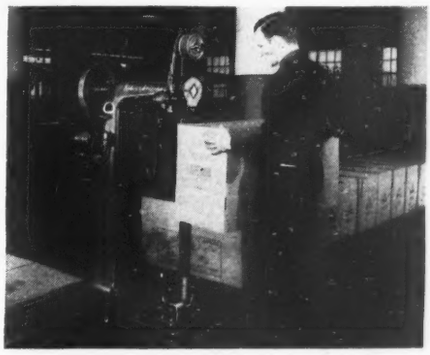


● Look at the records! One user was able to double the production of stitched cartons — by installing Acme Silverstitchers. Savings of 50% in both time and money made another manufacturer a strong supporter of this amazing new stitcher. To another concern Acme Silverstitchers meant a much stronger carton — a better and a neater job. No wonder this new box stitching equipment is commanding such phenomenal acceptance!

You can be setting box stitching records, too—records for speed and economy. Don't wait — get the facts now! Mail the coupon below.

### Teamed with ACME Silverstitch — for Stitching Satisfaction

Acme Silverstitch Stapling Wire is built to perform with Acme Silverstitchers. Engineered to work as a team, they assure stitching satisfaction year after year. Both wire and equipment are supplied and guaranteed by Acme Steel Company.



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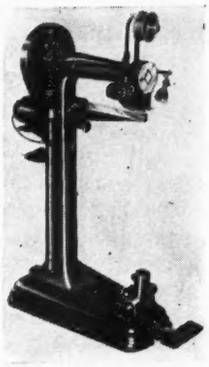

Adjustable single pedal control . . . Few moving parts mean lower maintenance costs . . . Vital parts are reversible . . . Low power consumption . . . Heavy duty construction for long service . . . Silent V Belt drive . . . Wide, comfortable foot-rest treadle . . . Resilient one-piece feed wheels . . . Handles two gauges of Silverstitch without adjustment.

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Mechanism is guarded for maximum safety. Individual parts are precision made and are interchangeable. Friction brake spring maintains continual pressure on clutch hub and simplifies brake adjustments.

Easy to operate . . . Runs smoothly and quietly . . . Efficient . . . Modern . . . Economical . . . Guaranteed.

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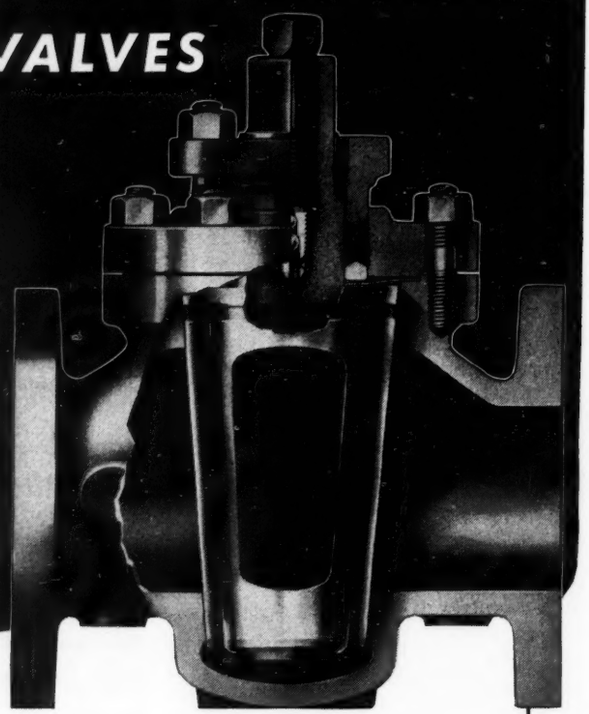
# WHEN SHOULD WALWORTH LUBRICATED PLUG VALVES BE USED?



## WHEN

When the conventional type of valve does not give satisfactory service, the solution is generally to be found in the Walworth Lubricated Plug Valve.

## WHERE

Where full direct port opening with one-quarter turn and a positive, tight shut-off is desired, use Walworth Lubricated Plug Valves.

## WHY

Because the Walworth Lubricated Plug Valve is a smooth-turning, easy to operate valve that remains completely sealed against leakage in either the open or closed position. It has demonstrated its ability to give a tight shut-off on substances difficult to hold, and where leaks are hazardous or costly.

Walworth Lubricated Plug Valves are manufactured in sizes from ½" to 24" for pressures from 125 lbs. to 5,000 lbs.

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VALVES FITTINGS and TOOLS

Backed by 99 Years' Service

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# FOOD TECHNOLOGY

## NEW DISCOVERIES AND INVENTIONS

## FOOD TECHNOLOGY

### Copper in Canned Tomatoes

THE COPPER CONTENT of canned tomatoes cannot be successfully reduced below about 50 p.p.m. Added to the natural copper content are unavoidable traces which gain access to the tomatoes from copper compounds used as insecticides and from copper or copper-alloy apparatus in the cannery. Dilute hydrochloric acid is relatively less effective for tomatoes than for other fruits as a copper remover, because dry brush cleaning removes practically all the clinging surface copper.

Complete prevention of contamination with copper in processing could be achieved only by eliminating all copper, brass, bronze and monel fittings or equipment. This would mean to find a new material, not itself a source of contamination, for brass fillers, copper pulpers (often having monel screens) and copper pans used for concentrating pulp. Contamination is especially heavy in starting up after a shutdown, so that there is even an increase in the morning as compared with later in the day. For this reason copper content varies in tomatoes, even in a single pack from one cannery.

Digest from "Copper Content of Tomato Products," by G. Horner, *Journal of the Society of Chemical Industry*, Vol. 60, 62, 1941 (Published in England).

### Bromelin in Pineapple Juice

BROMELIN, obtainable from pineapple juice, has several economic advantages over papain as a commercial proteolytic enzyme. As an agricultural byproduct, derived from a single variety of plant, it would be unusually uniform under the production conditions which would prevail in Hawaii. Manufacture would not require much addition to the canning facilities now available, and output could be easily adjusted to the demand. Only second or third press juice could compete with present commercial sources of papain, for high-grade juice would be too expensive. A disadvantage is that bromelin recovery from pineapple wastes or low-grade juice would be profitable only if other products such as sugar and citric acid were left intact. On the basis of laboratory trials, not yet reduced to production practice, it seems probable that precipitation from the filtered low-grade juice with alcohol could be developed into a profitable method. Filtration cost is a factor which has not yet been evaluated. With respect to its behavior as a proteolytic enzyme, bromelin has excellent heat stability and apparently the protein of which it is decomposed readily undergoes reversible denaturation. It is inert, but stable, in alkaline medium. It is active, but unstable, in acid medium.

Digest from "Bromelin: Properties and Commercial Production," by A. K. Balls, R. R. Thompson and M. W. Kies, *Industrial and Engineering Chemistry*, Vol. 33, 950, 1941.

## DAIRY PRODUCTS

### Poor Rennet Clotting Of Milk

There is in raw skim milk or whey an enzyme or enzymes, of esterase type, which hydrolyze (break up) esters of some of the constituents of milk fat, liberating the free fatty acids. Some of these fatty acids, namely lauric, oleic and capric, either liberated by the esterase or added as such, will interfere with or prevent the milk from being clotted by rennet. The other common fatty acids of milk fat do not have this effect. Normally this occurs only after aging at low temperatures followed by adding the rennet at 95 deg. F. Holding the mixture at 104 deg. F. for 30 minutes will again make the milk clot normally. With oleic acid no aging is necessary nor can the milk be completely restored to normal by the heat treatment. Adding calcium chloride deprives lauric acid of its anti-rennet action. When milk is treated so that some lipolysis—fat-splitting with bitter flavor development—occurs, there is again some interference with the normal action of rennet.

Digest from "Effect of Free Fat Acids of Milk Fat on Curd Tension of Milk. Relation to Milk Esterase, Temperature, Use of $CaCl_2$ Kind of Fat Acid, Milk Lipase, and Churning," by L. S. Palmer and C. L. Hankinson, *Journal of Dairy Science*, Vol. 24, 429, 1941.

### The Phosphatase Test

In using the phosphatase test for pasteurization, various details of technic are important. A photoelectric colorimeter is useful for determining the intensity of color produced and, once calibrated, saves the need of preparing phenol blanks as standards. A rather narrow filter of wavelength around 600 millimicrons is best. Time allowed for color development is important. Sixty minutes should be allowed with solutions containing but little phosphatase. Under the above conditions, Scharer's modification of the test, using 2,6-dibromoquinonechloroimide (BQC) as indicator, one can detect: (1) Underheating of 5 minutes at 142 or 143 deg. F., 10 minutes at 144 deg. F. and 15 minutes at 145 deg. F.; (2) too low a temperature by 1 deg. at 143 or 144 deg. F. or by 2 deg. at 145 deg. F.; (3) one-tenth of one percent of raw milk added to milk pasteurized at 142 to 145 deg. F. for 30 minutes.

The test is not affected by irradiation, addition of vitamin D concentrates, adding pancreatic extract (Enzylac), metal contamination (copper, nickel, iron, aluminum, tin) up to 10 parts per million, development of oxidized flavor, homogenization or refrigerated storage up to six days.

Digest from "Studies on the Phosphatase Test and Its Application to Processed and Treated Milks," by N. A. Perry and F. J. Doan, *Journal of Dairy Science*, Vol. 24, 369, 1941.

## SUGAR

### Caramelizing Raw Sugar

Raw cane sugar caramelizes faster than refined sugar and reaches a much higher degree of dehydration. In comparative tests at 180 to 190 deg. C., under atmospheric pressure, it was also found that the caramel is essentially different in composition. Whereas pure sugar yields a completely water-soluble caramel which is not precipitated from its cold solution by acid, the caramel from raw sugar contains a water-insoluble fraction which is ac-

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companied by an acid-precipitatable soluble fraction. The insoluble fraction is composed mainly of humins. Humins are a portion of the brown or black material formed by the partial decomposition of vegetable or animal matter. The precipitate which forms when the solution is acidified has approximately the same composition. Both the water-insoluble and the water-soluble, acid-insoluble humins increase in amount as the degree of dehydration increases.

Another property of caramel from raw sugar is that its reducing power, after inversion, decreases as degree of dehydration increases. This continues until finally the caramel has no reducing power as measured by the usual test for reducing sugars. All caramels from raw sugar, whatever the degree of dehydration, are completely accounted for by the water-insoluble humins, acid-insoluble humins and a third fraction which is soluble in methanol.

It is probable that the minerals present in raw sugar are responsible for the faster and more extensive dehydration by heat. Further research on the nature and action of these minerals is needed.

Digest from "Composition of Products Formed by Caramelizing Raw Sugar," by Pedro Cattaneo, *Anales de la asociacion quimica argentina*, Vol. 29, 35, 1941 (Published in Argentina).

# PACKAGING

## Containers for Pasteurized Fruit Juices

Comparative tests of bottles and cans for packaging pasteurized fruit juices showed good results with certain types of enameled cans but not with any plain tinned can. Among the bottles both plain and colored crown bottles are satisfactory as containers for acid fruit juices such as are produced in the northeastern states. Apple juice kept better in enameled cans than in bottles in two series of tests, probably because juice pasteurized for bottling was not cooled rapidly for fear of breaking the bottles.

The importance of rapid cooling after pasteurizing is now gaining more recognition. Later tests, in which canned and bottled juices received the same heat treatment and were cooled as rapidly as possible, showed a slight superiority of green bottles and cans over plain and amber bottles as containers. If freshly pressed apple juice is quickly deaerated, flash pasteurized at 165-175 deg. F., held 3 minutes and then filled hot and full and cooled as rapidly as possible it will retain maximum flavor either in bottles or in suitable enameled cans.

Tests with cherry and grape juices showed some staining of enemaled cans and some color changes in the juices, but in general no great flavor differences between canned and bottled juices.

Digest from "Containers for Apple and Other Fruit Juices Pasteurized by the Flash Method," by C. S. Pederson, H. G. Beattie and E. A. Beavens, *Proceedings of the First Conference*, Institute of Food Technologists, 1940, p. 205.

# MILLING AND BAKING

## Green Grain Bug And Baking Quality

GREEN GRAIN BUG (*Chlorochroa uhleri Stal*) infestation of wheat is a problem for millers and bakers as well as for entomologists and wheat growers. Tests with 13 varieties of wheat showed that attack by this insect lowers weight per bushel, reduces protein content, prevents clean separation of wheat products in milling and seriously impairs baking quality. Doughs from injured wheat are short and dead as compared with doughs from sound wheat. Loaf volume is greatly decreased while crumb color and texture are adversely affected. Gluten quality is injured, apparently by proteolytic enzymes injected by the bug. In severe cases the gluten disintegrates and cannot be washed free from starch.

Some wheats are much more resistant to green grain bug than others. Thus, Renown showed only 16.8 percent damaged kernels as compared with 55.2 percent in Kubanka wheat. Millers should take utmost care to avoid use of grain damaged by green grain bug.

Digest from "Effect of the Green Grain Bug on Milling and Baking Quality of Wheat," by R. H. Harris, L. D. Sibbitt, J. A. Munro and H. S. Telford, *Bimonthly Bulletin* of North Dakota Agricultural Experiment, Vol. 3, No. 5, 10, 1941.

## Malt in Flour

ADDITION of malt to flours with low diastatic activity is good practice if properly controlled. The maltose thus introduced increases gas production, improves crust color and keeping quality (moisture retention) and adds a desirable flavor. But added malt in flour having ample diastatic activity of its own causes excessive degradation of starch. The dough becomes sticky and difficult to handle, especially in fully mechanized bakeries. The baked loaf is likely to be doughy, causing trouble on the slicing machines.

Various commercial improvers contain a mixture of soybean and malt flours. Soybean flour has high beta-amylase activity but no alpha-amylase. Hence in testing improvers a reagent must be used which is sensitive to both amylases. A modified Kent-Jones method is recommended for determining maltose. When 0.4 to 0.6 percent of malt is added to a low-diastase flour it will increase maltose content by about 1.2 percent, an amount which suffices to improve bread in the ways mentioned above.

Digest from "Evaluation of Malt Products for Use in the Breadmaking Industry," by H. C. Freeman and W. P. Ford, *Journal of the Society of Chemical Industry*, Vol. 60, 6, 1941. (Published in England).

# VITAMINS

## Manganese and Vitamin C

One of the factors governing the quantity of ascorbic acid (vitamin C) in young plants is the amount of manganese in the soil. The ascorbic acid content of the fruit from plants grown on 12 soils known to be low in available manganese averaged 200 milligrams per liter of pulp, whereas samples from 12 soils known to be higher in available manganese analyzed 269 milligrams.

In pot culture the application of one gram of hydrated manganese sulphate ($MnSO_4.4H_2O$) in a localized area, to 15,000 grams of sassafras sandy loam soil, testing pH 7.1, increased the ascorbic acid content in tomato pulp from 142 to 243 milligrams per liter.

There are other reasons that lead us to believe that manganese is a factor in ascorbic acid formation, but these cannot be reported at this time.

Digest from "Manganese and Vitamin C," by Jackson B. Hestor, *Science*, April 25, 1941, p. 401.

## Fortifying Bread and Milk Products

Following recommendations of the Committee on Food and Nutrition, National Research Council, enriched bread contains 1 to 2 mg. of thiamin, 4 to 8 mg. of nicotinic acid and 4 to 16 mg. of iron per pound of baked bread. Optionally, it may also be fortified with 0.8 to 1.6 mg. of riboflavin, 150 to 600 U.S.P. units of vitamin D and 300 to 1,200 mg. of calcium per pound.

The bread may be made with enriched flour, with enriched yeast or by direct addition of crystalline vitamins


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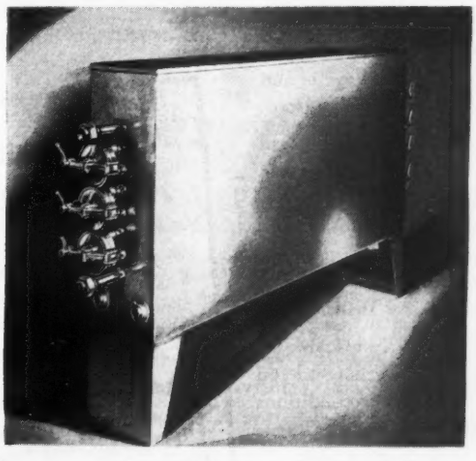

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and assimilable iron salts such as iron phytate, sodium iron pyrophosphate or ferrum reductum. Iron is a more difficult problem than the vitamins because of uncertainty as to whether or not a given iron salt is assimilable. It has not yet been fully demonstrated that any one of the three iron salts mentioned above is utilized by the body, in the form in which it occurs in enriched bread. Enriched yeast is produced by culturing bakers' yeast to a high thiamin content and adding nicotinic acid and iron.

Vitamin enrichment of milk has been familiar practice for some time in irradiated milks and milks with vitamin D concentrate added. A more recent development is enrichment of margarine in vitamin A by adding fish liver oil. On the other hand, milk is itself a potential medium for enriching bread since 6 percent of milk powder added to flour introduces significant quantities of riboflavin and calcium.

Digest from "Fortification and Restoration in the Baking and Dairy Industries," by J. A. Tobey and W. H. Cathcart, *Industrial and Engineering Chemistry*, Vol. 33, 714, 1941.

## FROZEN FOODS

### Quality of Frozen Meat

Beef roasts, wrapped in Cellophane and tied in stockinette, were frozen in still air at 0, −10 and −25 deg. F. and in the air blast from a fan at the same temperatures. Roasts wrapped by shrinking a latex rubber bag around them were frozen at 0 and −25 deg. F. by brine immersion, and at −25 deg. F. in a brine spray. Brine-immersion freezing is about twice as fast as air blast and about four times as fast as still-air freezing. Leakage loss on thawing averaged about 3.5 percent for fast frozen (brine-immersed) meat, 6 percent for meat frozen by air blast and 8 percent for meat frozen in still air. Palatability tests rated all the frozen meats "good," but on a grading scale of 7 points the judges graded fast frozen meat 0.62 point higher in one test and 0.76 point higher in another test than slow frozen meat.

Frozen pork, lamb, veal chops and beef steaks were stored, after air-blast freezing, at 15, 10, 0, −8 and −40 deg. F. The cuts were heat-sealed in "moistureproof vegetable parchment" and wrapped in a Peters type cold-waxed carton. At −8 and −40 deg. F. no rancidity developed in 14 months. At 0 deg. F. pork (but not the other meats) showed some rancidity in 12 months. At 10 and 15 deg. F. rancidity appeared in pork in about 4 months and in the other meats in about 5 months.

Digest from "Influence of Freezing Rate and Storage Temperature on Quality of Frozen Meat," by C. W. Du Bois, D. K. Tressler and Faith Fenton, *Proceedings of the First Conference*, Institute of Food Technologists, 1940, p. 167.

# MISCELLANEOUS

## Digestibility Of Chocolate Milks

THE coloring matter of cocoa, cacao red, acts somewhat like tannin in combining with the proteins of milk and lowering their digestibility, as shown in experiments on rats and cows, and on one man who was his own guinea pig. When rats are fed a ration consisting of whole milk powder, sugar and salts, with or without about 16 percent of cocoa, either regular or Dutch process, there is a reduction of around 6 percent in the digestibility of the milk protein.

Since only about 1 percent of cocoa is used in chocolate-milk drinks, the reduction in digestibility of the milk protein in these is slight and probably negligible.

Digest from "The Effect of Cocoa upon the Digestibility of Milk Proteins," by L. D. Lipman and W. S. Mueller, *Journal of Dairy Science*, Vol. 24, 399, 1941.

## Aconitic Acid From Sugar Cane

Cream-colored sediment sometimes found in first and second molasses tanks is mainly calcium aconitate. Refinery pan and evaporator scales also contain aconitic acid. Sirups derived from two types of cane and made without chemical clarification contained 0.75 to 1.33 percent aconitic acid, calculated on the solids content. Two samples of Louisiana final molasses contained 1.8 and 2.52 percent aconitic acid, respectively.

It appears from the findings that sugar cane juice is richer in aconitic acid than has been supposed. Aconitic acid is potentially useful as a source of maleic acid derivatives serving as intermediates in the manufacture of plastics and plasticizers. Citric acid can be dehydrated to aconitic acid, but a cheaper and more convenient source is needed for the industrial utilization of this acid. Hence sugar cane may prove to be a convenient natural source, offering a new opportunity to sugar refiners for byproduct recovery.

Digest from "Aconitic Acid From Sugar Cane Products," by M. A. McCalip and A. H. Seibert, *Industrial and Engineering Chemistry*, Vol. 33, 637, 1941.

## Method of Making Apple-raspberry Juice

Because of a surplus of fruits throughout the country, an attempt is being made to dispose of these fruits through channels that are both attractive and pleasing to the consuming public.

One important outlet is for blended juices to be used in various industries. Wine producers and apple packers have realized for years that a blend of different varieties of fruit juices often gives a product much superior to either of the individual ingredients. Fruits from the northeastern states have distinct qualities which make them very desirable for the production of beverages and fruit juices.

Studies have been made of blending the juices of some of the larger fruits with those of the smaller fruits. Examples of these are blending juices of apples or pears with the juices of strawberries, raspberries, blackberries and currants. It was found that a blend of purple and black raspberry juices with apple juice gave a product superior to any one of these alone.

Another problem was to obtain the desired quality of the combined juices. The most satisfactory method of obtaining raspberry juice of a good flavor and color was to freeze and hold the raspberries during the fruiting period until the apples were ready to press, then thaw and press the berries. The thawed berries yielded practically as much juice and the color was as good as the hot-pressed berries. Further, if the raspberry pomace was extracted with apple juice at 140 to 145 deg. F., an additional desirable quality was imparted, as well as added color and yield. This juice blended with apple juice and with a small amount of sugar to bring out the flavor, was preferred over other blends.

The initial sales of this juice was very gratifying. A large number of customers requested additional sales after the supply had been depleted. Questionnaires were also mailed to a number of purchasers of the juice. Approximately 99 percent of the purchasers replied favorably.

From the favorable reception given the apple-raspberry juice, it seems that the product has commercial possibilities. There is a need for additional outlets for these fruits and the public desires such products.

Digest from "Results of a Demonstration Sale of Apple-Raspberry Juice," by Carl S. Penderson, H. G. Beattie and E. A. Beavens, *Fruit Products Journal*, Vol. 20, April, 1941.


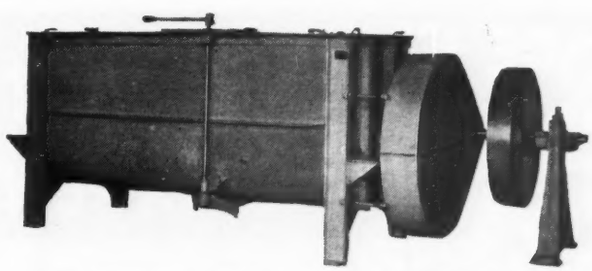

Figure 690.—TROWEL TYPE MIXER—BELT OR MOTOR DRIVEN

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# BOOKS

## Cereal Chemists' Handbook

CEREAL LABORATORY METHODS. Fourth Edition. Published by American Association of Cereal Chemists, 110 Experiment Station Hall, Lincoln, Neb., 1941. 264 pages; 6¼x9½ in.; cloth. Price, $2.50.

As indicated by the title, this book is something of a handbook of methods used in cereal testing laboratories. Much of the statistical information, however, is of value to the processor and user of cereal products.

To take a sample of the contents, the chapter on wheat and other whole grains covers directions for sampling, preparation for analysis, test weight per bushel, moisture, protein, ash, smut in wheat or rye, detection of sulphur bleached grain, alcoholic acidity of corn, fat acidity and wheat pigments.

The other chapters pertain to experimental milling; wheat flour, semolina and similar products; feeds and feeding stuffs; rye; malt; enzymatic, physicochemical and bacteriological methods; baking methods; bread; experimental macaroni processing; macaroni products; fats and shortening materials; leavening agents; yeast foods, bleaching agents and flour improvers.

The Appendix contains information on the statistical principles of experimental errors, preparation and standardization of solutions, reference tables and moisture correction charts.

## Domestic Essential Oils

THE DOMESTIC PRODUCTION OF ESSENTIAL OILS FROM AROMATIC PLANTS. Published by National Farm Chemurgic Council, 50 W. Broad St., Columbus, Ohio, 77 pages; 6¾x10 in.; paper. Price, 50 cents.

Both because of the effect of the war on supplies and because of the amount spent on imports, a study is believed warranted of the possibility of domestic cultivation of aromatic plants and the establishment of an essential-oil industry. Which gives particular importance to this compilation of research papers relating to the agricultural production of essential oils. Raw materials for essential oils, the role of the agricultural engineer in the production of essential oils, the preferential odor rating of essential oils from coriander seeds and the laboratory assayment of raw materials for essential oils are covered.

## Keeping Quality of Hops

EFFECT OF COMPRESSION ON THE KEEPING QUALITY OF HOPS. By Frank Rabak. Published by Brewers' Hop Research Institute, Chicago, Ill. 10 pages; 6x9 in.; paper. Free.

Brewers, dealers and growers of hops will be interested in this pamphlet. It gives conditions under which hops can be maintained in good condition for adequately long periods.

Included in the article are graphs showing the effect of compression on the different resin content of the hops. Also discussed are the effects of compression and different atmospheric conditions upon the moisture content of the hops in storage.

## Barleys Evaluated

INDUSTRIAL EVALUATION OF TWO BARLEY VARIETIES GROWN IN 1939. Malt Research Institute Publication No. 1. Published by Malt Research Institute Madison, Wis., 1941. 64 pages; 7x10 in.; paper. Copies may be obtained by writing the Institute's secretary, Box 2039, Madison, Wis.

The data on the commercial evaluation of the two barley varieties, Oderbrucker and Wisconsin Barbless, are of value to the brewing, malting and other food industries. Included are the yield and general quality of the two varieties grown in two localities, the comparative malting quality, and the suitability of the malts for processing by various industries.

## Quality of Frozen Poultry

QUALITY OF FROZEN POULTRY AS AFFECTED BY STORAGE AND OTHER CONDITIONS. Technical Bulletin No. 768. Published by U. S. Department of Agriculture, Washington, D. C. 1941. 19 pages; 6x8 in.; paper. Price, 5 cents; for sale by Superintendent of Documents, Washington, D. C.

Significant new information for the poultry freezing industry, obtained during a three-year experiment, are given in this bulletin. One of the important conclusions from the data is that storage temperatures as low as minus 20 deg. F. are more favorable than 0 deg. F. to the quality of dressed poultry. Drawing apparently has little effect during customary storage periods. Data on other factors, such as loss of moisture and bacterial count, are presented. All food technologists, as well as the men in the poultry freezing industry will find this information useful.

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# PATENTS

**Fatty Oils Refined in Continuous Manner by Addition of ½ to 5 Percent Water Prior to Passing Through Centrifugal Rotor With an Alkaline Solution for Separation Into Soap Stock and Refined Oil Fractions**—Arthur U. Ayres, Chestnut Hill, Pa., to The Sharples Corp., Philadelphia, Pa. No. 2,245,846. June 17 1941.

**Corn Husked During Movement Through Husking Machine While in Transverse Position to Longitudinal Movement Through Machine**—Charles E. Kerr, Hoopeston, Ill., to Food Machinery Corp., San Jose, Calif. No. 2,245,861. June 17, 1941.

**Fruit Halves Inverted for Inspection of Under Surface During Passage Along Inspection Belt Conveyor**—William C. Gridley and Edward T. Magnus, one-half to Gridley and one-half to P. M. Ball & Co., Oakland, Calif. No. 2,245,913. June 17, 1941.

**Meat Packaged in Casings Shaped During Curing and Smoking by Tension on Casing held Taut by Support Having Hook Arm at One End and Recess at Other End With Plurality of Oppositely Positioned Parallel Notches Between Ends of Support for Engaging Free End of Casing**—Josef Wohlmuth, Wilkinsburg, Pa., one-half to Henry Wagerer Pittsburgh, Pa. No. 2,246,229. June 17, 1941.

**Buns, Cup Cakes and Like Baked in Pan Consisting of Plurality of Cup Walls Open at Both Ends But Closable on Bottom With Demountable Base Plate**—Van Lear Woodward, Staten Island, N. Y. No. 2,246,334. June 17, 1941.

**Candy Canes Cut and Shaped by Mechanical Means**—Robert I. Strongin, Chicago, Ill. No. 2,246,420. June 17, 1941.

**Biscuit-like Dough Forms Cut and Simultaneously Removed From Point of Cutting Operation and Expelled Upon Baking-pan Surface**—Charles Gainer Turner, Atlanta, Ga. No. 2,246,424. June 17, 1941.

**Soya Protein Prepared by Digesting Soy Bean Extract in Caustic Alkali and Lime Solution With Sodium Peroxide**—Percy L. Julian, Oak Park and Bernard T. Malter, Chicago, Ill., to The Glidden Co., Cleveland, Ohio. No. 2,246,466. June 17, 1941.

**Spices Made Readily Extractable Without Loss of Flavor by Subjecting to Elevated Temperature and Pressure With Sudden Release to Produce Disrupted Condition**—Albert Musher, to Musher Corp., New York, N. Y. No. 2,246,528. June 24, 1941.

**Starch Treated With Small Amount of Water and From 2½ to 10 Percent Formaldehyde or Formaldehyde-producing Reagent Preliminary to Heating and Pressing Into Thin Layers At Temperature Above Gelatinization for Drying and Subsequent Grinding**—Frederik André Möller, Groningen, Netherlands, to Naamlooze Vennvotschap: W. A. Scholten's Chemische Fabricken, Groningen Netherlands. No. 2,246,635. June 24, 1941.

**Doughnuts and Similar Greasy Surfaced Foods Packaged in Grease Resistant Container Whose Outer Walls Contain Between 2½ and 10 Percent Titanium Oxide Incorporated in 75 Percent Bleached Sulphite and 25 Percent Unbleached Sulphite Board**—Albert L. Sherwood, to Sutherland Paper Co., Kalamazoo, Mich. No. 2,246,818. June 24, 1941.

**Olives, Pitted in Automatic Manner**—Edward P. Drake, Los Angeles, Calif., to Lindsay Ripe Olive Co., Lindsay, Calif. No. 2,256,843. June 24, 1941.

**Edible Semi-solids Distributed Irregularly Throughout Ice Cream Mass by Being Deposited in Grooves Formed Spirally in Ice Cream as it is Forced Through Cylinder Fitted With Groove-Cutting Devices**—Gerald G. Balch Pittsburgh, Pa. No. 2,246,871. June 24, 1941.

**Citrus Fruits Stripped and Sectioned Into Juice-cell Groups by Mechanical Means**—Ralph Polk, Sr., Miami, and Ralph Polk, Jr., Haines City, Fla., to The Polk Development Company, Tampa, Fla. Nos. 2,246,896 and 2,247,589. June 24 and July 1, 1941.

**Irregular Masses of Meat Molded Into Desired Shapes and Sizes by Enclosing in Tubular Flexible, Elastic, Porous Casing and Compressing Casings at Desired Points**—Herbert Rumsey Jr., Nutley, N. J. No. 2,247,312. June 24, 1941.

**Bread Loaves Sliced and Divided Into Slice Groupings, Wrapped, Portions Realigned Into Loaf Form and Given Overall Wrapping**—Gustav C. Papendick, University City, Mo., deceased; Elizabeth Papendick, executrix, assigned to Papendick, Inc., St. Louis, Mo. No. 2,247,401. July 1, 1941.

**Corned Beef Made by Wrapping Beef-Cut in Pork Caul Fat, Injecting Curing Agent in Beef and subjecting Entire Mass to Curing Pickle**—Beverly E. Williams, to Industrial Patents Corp. Chicago, Ill. No. 2,247,425. July 1, 1941.

**Fatty Oils Refined by Neutralizing With Alkali, Permitting Soap Stock to Stratify for Removal Before Treated Oil Layer is Mixed With Water Preliminary to Centrifuging for Separating of Oil From Remaining Soap Stock and Added Water**—Arthur U. Ayres, Chestnut Hill, Pa., to The Sharples Corp., Philadelphia, Pa. No. 2,247,430. July 1, 1941.

**Drupe-type Fruit Mechanically Orientated for Removal of Seeds**—Ellsworth W. Carroll, to S. & W. Fine Foods, Inc., San Francisco, Calif. No. 2,247,602. July 1 1941.

**Means for Separating Sliced Loaves of Bread Into Groups for Wrapping and Reassembling Into Whole-loaf Alignment**—Walter A. Thum, to Papendick, Inc., St. Louis, Mo. Nos. 2,247,672; 2,247,673; 2,247,674; 2,247,675, and 2,247,676. July 1 1941.

**Sliced Bread Loaves Separated Into Fractional Units by Mechanical Means**—Anthony H. Wolf and Walter A. Thum, to Papendick, Inc., St. Louis, Mo. No. 2,247,678. July 1, 1941.

**Bread Loaves Sliced, Separated Into Several Sliced Groups for Wrapping and Realigned Into Whole-loaf Form for Rewrapping**—Gustav C. Papendick, University City, Mo., deceased, Elizabeth Papendick executrix, to Papendick, Inc., St. Louis, Mo. Nos. 2,247,692; 2,247,693; 2,247,694; 2,247,695; 2,247,696; 2,247,697; 2,247,698, and 2,247,699. July 1 1941.

**Water and Similar Liquids Sterilized by Passing Over Solids Coated With Six-carbon-atom Aliphatic Amines or Their Salts**—Anderson W. Ralston, Chicago, and Ervin W. Hopkins, Hinsdale, Ill., to Armour and Co., Chicago, Ill. No. 2,247,711. July 1, 1941.

**Pineapples Cut Into Slices Uniform in Thickness by Mechanical Means**—Robert Fleming Healy, to Hawaiian Pineapple Co., Limited, Honolulu Territory of Hawaii. No. 2,247,810. July 1, 1941.

**Egg Meats Given Mechanical Treatment to Make Thin, Homogeneous Liquid Product**—Benjamin R. Harris, Chicago, Ill. No. 2,248,077. July 8, 1941.

**Vitamin $B_6$ Synthesized by Using Ethoxyacetylacetone and Cyanoacetamide as Starting Materials**—Stanton A. Harris, Westfield, N. J., to Merck & Co., Inc., Rahway, N. J. No. 2,248,078. July 8, 1941.

**Extracted Hop Principles Emulsified With Equal Quantity of Malt Sirup to Form Standardized Product**—Lyndon D. Wood to National Hops Laboratories, Inc., Chicago, Ill. No. 2,248,153. July 8, 1941.

**Fruit Branded by Identifying Mark Mechanically Applied**—Ira A. Tedder, San Benito, Tex., to Tedder Fruit Branding Machine Co. No. 2,248,208. July 8, 1941.

**Pie Fillings Frozen in Mold Having Desired Size and Thickness, Removed from Mold, Enclosed in Unbaked Pie Crust, Refrozen and Held in Cold Storage for Future Use**—Martha Thal, Chicago, Ill. No. 2,248,289. July 8, 1941.

**Pretzel Sticks Formed Without Distorting or Modifying Condition of Dough**—John H. Walborn, Harrisburg, Pa. No. 2,248,291. July 8, 1941.

**Toasted Cereal Food Made From Mixture of Flaked Grain, Bran, Ordinary Baked Bread and Seasoning**—Harold K. Wilder, Palo Alto, Calif., to Stanley S. Langendorf, San Francisco, Calif. No. 2,248,292. July 8, 1941.

**Nuts Shelled by Igniting Explosives Gas in Space Between Kernel and Shell of Nut**—Arthur S. Leonard, Berkeley, and Harry B. Walker, Davis, Calif. to Regents of University of California, Berkeley, Calif. No. 2,248,365. July 8, 1941.

**Nuts Shelled by Introducing Explosive Gas Through Perforation in Shell, Sealing Perforation to Prevent Escape of Gas and Passing High-tension Electric Spark Through Nut to Ignite Gas**—Arthur B. Low, Denver, Colo., to Regents of University of California, Berkeley, Calif. Nos. 2,248,367 and 2,248,368. July 8, 1941.

**Frozen Confections Given Coating of Chopped Nuts While Positioned Under Opening in Bottom of Nut Storage Chamber; Excess Chopped Nuts Returned to Storage Chamber by Bucket Elevator**—Marlin B. Rasmussen, Los Angeles, Calif. to Joe Lowe Corp., New York, N. Y. No. 2,248,643. July 8, 1941.

**Ice Cream Sandwich Type of Confections Made on Plural Basis in Molds Designed to Hold Edible Crackers Adjacent to Their Side Walls During Filling Operation**—Lester W. Von Losberg, Teaneck, N. J., to Joe Lowe Corp., New York, N. Y. No. 2,248,651. July 8, 1941.

**Sausage Stuffing Operation Doubled in Production Output by Use of Auxiliary Supply Cylinder Connected by Valved Passage With Working Cylinder**—Adrian C. Van Hooydonk, to John E. Smith's Sons Co. Buffalo, N. Y. No. 2,248,835. July 8, 1941.

**Confections Packaged in Inflatable Rubber Balloon-type Container**—Lloyd G. Copeman, to Copeman Laboratories Co., Flint, Mich., No. 2,248,063, July 15, 1941.

**Vegetable Oil "Foots" Treated for Recovery of Purified Phosphatides**—Percy L. Julian, Oak Park, and Andrew G. Engstrom, Chi-


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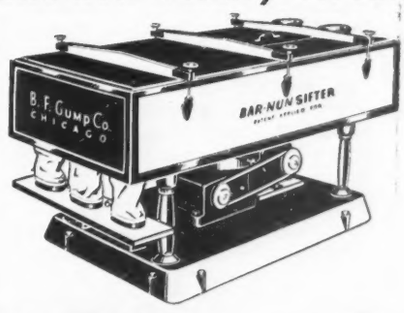


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cago, Ill., to The Glidden Company, Cleveland, Ohio. No. 2,249,002. July 15, 1941.

**Protein Modified by Dispersing in Molten Urea and Treating With Formaldehyde**—Percy L. Julian, Maywood, and Elmer B. Oberg, Evanston, Ill., to The Glidden Company, Cleveland, Ohio. No. 2,249,003. July 15, 1941.

**Liquids Pasteurized by Heat Treatment in Container Having Double-wall Construction, Bottom Spreader Plate and Means for Spraying Temperature-changing Liquid Downwardly Alongside of Inner Wall, for Forcing Stream of Liquid Between Bottom of Inner Wall and Spreader Plate and for Storing of Liquid in Space Between Inner and Outer Walls**—Norman J. Peters, to Damrow Brothers Co., Fond du Lac, Wis. No. 2,249,036. July 15, 1941.

**Cereal Flakes Toasted in Traveling-conveyor-type Oven Equipped for Recirculating and Distributing Heated Air Throughout Oven Under Controlled Conditions**—Donald E. Marshall, to Kellogg Co., Battle Creek, Mich. No. 2,249,152. July 15, 1941.

**Grape Juice Containing Natural Wine Yeast, Wild Yeasts, Molds and Bacteria Treated With Liquid $SO_2$ in Proportions to Destroy Wild Yeast, Molds and Bacteria and Permit Unretarded Fermentations of Juice Into Wine by Natural Wine Yeast**—James A. Thomas, Berkeley, Calif., to Esotoo Fumigation Co., Ltd., San Francisco, Calif. No. 2,249,262. July 15, 1941.

**Vegetable and Animal Oils Continuously Refined in Vertical Two-chambered Unit Equipped With Horizontal Plate Baffles, Rotatable Paddle Agitator and Means for Varying Temperature of Second-chamber Contents**—George Frederick Wheelwright, Jr., Westfield, N. J., to The De Laval Separator Co., New York, N. Y. No. 2,249,263. July 15, 1941.

**Vitamin-containing Oils Freed From Undesirable Odor and Taste During Short-path, Low-pressure Distillation**—Kenneth C. D. Hickman and John C. Hecker, to Distillation Products, Inc., Rochester, N. Y. No. 2,249,524. July 15, 1941.

**Vitamin A Concentrate From Fish Oil Clarified by Extracting Impurities by Treatment With Methyl or Ethyl Alcohol**—Kenneth C. D. Hickman to Distillation Products, Inc., Rochester, N. Y. No. 2,249,525. July 15, 1941.

**Organic Liquid Purified by Multi-Stage Distillation Under High Vacuum While in Thin Film Form**—Kenneth C. D. Hickman to Distillation Products, Inc., Rochester, N. Y. No. 2,249,526. July 15, 1941.

**Pie Dough Formed in Press Designed to Handle Multiple Pie Tins**—Alice Richardson, Phoenix, Ariz. No. 2,249,667. July 15, 1941.

**Vegetables Riced by Being Forced Through Openings by Pressure of Rotating Roll Surface Against Endless Screen Conveyor Carrying Vegetables on Upper Surface of Lower Flight**—Orville Gano, Burley, Idaho. No. 2,249,688. July 15, 1941.

**Vegetables and Fruits Freed From Skin by Action of Fabric-covered Parallel Driven Rolls Arranged to Form a Trough-like Receptacle Into which Water is Directed From Spray Nozzle Onto Rolls and Articles to be Skinned**—Baillie N. Savage, to Sanitary Food Processing Co., Inc., Seattle, Wash. No. 2,249,787. July 22, 1941.

**Fermentation in Sugar-containing Mashes Without Substantial Increase in Yeast Growth Obtained by Inoculating Yeast-containing Mash With Synthetic Vitamin $B_1$; Rate of Fermentation Dependent Upon Vitamin $B_1$ Content of Mash**—Alfred S. Schultz and Lawrence Atkin, Bronx, and Charles N. Frey, Scarsdale, N. Y., to Standard Brands, Inc., New York, N. Y. No. 2,249,789. July 22, 1941.

**Liquid Contents of Fruit-treating Tank Sterilized Without Raising Temperature of Liquid in Contact With Fruits Above Sterilizing Temperature**—Bronson C. Skinner, Dunedin, Fla. No. 2,249,792. July 22, 1941.

**Starch Cakes Formed on Wheel-shaped Rotating Filter Frame Carrying Plurality of Cake-forming Boxes Into Which Starch Suspension is Drawn for Separation of Solids from Liquid**—Carl Hagen, Park Ridge, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,249,823. July 22, 1941.

**Fermentation Temperature in Wine Making Controlled by Withdrawal of Fermented Must, Separation of Pomace, Cooling of Liquid to 60 to 65 deg. F., Separation of Lees by Centrifuging, and Returning of Cool Lees to Tank for Mixing With Fresh Must; Separated Cool Juice Mixed With Air and Held for Further Treatment**—Frank W. Hopper, Selma, Calif. No. 2,249,830. July 22, 1941.

**Sugar Sirup Refined by Activated-carbon Method, Bleached With Hypochlorites or Hypobromites**—Charles W. Taussig and Albert C. Roland, to Applied Sugar Laboratories, Inc., New York, N. Y. No. 2,249,920. July 22, 1941.

**Dough Portions Twisted by Mechanical Means**—Frank J. Wittmann, Los Angeles, Calif. No. 2,249,925. July 22, 1941.

## *Canadian Patents*

**Butter Chilled Suddenly in Extruder Section of Butter-making Machine Preparatory to Finishing in Working Section**—Joseph O'Connell and Harold Kerr, Kensington, Victoria, Australia. No. 396,582. May 20, 1841.

**Foods Frozen in Brine Containing 10 to 18 Percent Salt and 20 to 34 Percent Invert Sugar, Together With About 2 Percent Sucrose**—Harry A. Noyes, Newton and Arthur D. Little, Inc., Cambridge, to Z. Pack Corp., Boston, Mass. No. 396,705. May 20, 1941.

**Bread From Automatic Slicer Tilted Loaf by Loaf From Slicer Delivery Platform Onto Conveyor Platform and Carried to Automatic Wrapping Machine**—Israel C. Gellman, to Gellman Mfg. Co., Rock Island, Ill. No. 396,810. May 27, 1941.

**Ripening of Fruits and Berries Accelerated With Improved Effect Upon Color, Flavor or Keeping Quality by Spraying Plant During the Growing Season With Solution Containing a Very Low Concentration of Thiocyanate**—Robert B. Dustman, Morgantown, W. Va. No. 397,034. June 10, 1941.

**Coffee Roasted in Electrically Operated Roaster in Which Charging and Discharging of the Roasting Compartment are Controlled by Gate Valves So Arranged That Green Coffee Awaiting Treatment Operates the Switch**—Albert C. Waldvogel, Richmond Heights, Mo. No. 397,067. June 10, 1941.

**Food Tins Formed With Opening Defined by Upstanding Ring Adapted to Receive Cover Having Grooved Outer Flange Containing Sealing Medium**—Frederick J. Fison, to Chivers and Sons, Ltd., Cambridge, England. No. 397,099. June 10, 1941.

**Fish and Meat Glazed With Noncracking Frozen Water Film Containing Boric Acid to Form Eutectic Compound**—Robert H. Bedford, Prince Rupert, B. C., to Fisheries Research Board of Canada, Ottawa, Ontario. No. 397,453. June 24, 1941.

**Fish and Meat Glazed With Transparent Ice Formed From Water Containing Edible Polyhydric Aldehydic or Keto Alcohol**—Robert H. Bedford, Prince Rupert, B. C., to Fisheries Research Board of Canada, Ottawa, Ontario. No. 397,454. June 24, 1941.

**Foods Fried in Deep-fat Cooker With Timing Device and Mechanism for Raising Basket Out of Molten Fat At End of Specified Time**—Kenneth E. Bemis, Oakland, Calif. No. 397,552. July 1, 1941.

**Butter Churned From Cream Tempered by Chilling to Below 21 Deg. F., Diluted to Suitable Fat Concentration and Soured**—Henricus A. Linthorst, to Naamlooze Vennootschap Linthorst-Koelhuis en Ijsfabrieken, Deventer, Holland. No. 397,891. July 8, 1941.

**Vegetable and Fruit Juices Aseptically Preserved by Treatment in Bulk With Alternating Current to Clarify Juice Preparatory to Alternating-current Sterilization in Small Lots**—Felix Trzoska. Bad Kreuznach, Germany. No. 398,039. July 15, 1941.

**Confections Mounted on Safety Stick Notched at Neck to Break Under Accidental Stresses**—Edward E. Cahoon, Racine, Wis. No. 398,069. July 22, 1941.

**Dry-roasted Dextrine Given Nonlumping Property by Heating For Not Over 5 Min. at 70 to 130 Deg. C. Under Pressure of About 1 Lb. Per Sq. In. Between Hot Plates**—Philip D. Coppock, Higher Bebington, Cheshire, England. No. 398,071. July 22, 1941.

# FORMULAS FOR FOODS

FORMULA NO. 219

## Maraschino Cherry Fudge Icing

| | |
|---|---|
| Confectioners XXXX sugar | 5 lb. |
| Maraschino cherries (diced) | 1 lb. |
| Maraschino cherry juice | 10 oz. |
| Fondant | 6 lb. |
| Shortening | 12 oz. |
| Butter | 12 oz. |

### *Mixing Directions*

Place sugar, diced cherries and cherry juice in machine bowl. Mix to a smooth paste. Use low speed. Add fondant, shortening and butter to the above mixture. Mix thoroughly until icing is smooth and of the desired consistency.

These directions are for a 3-speed machine. On a 4-speed machine use second speed.

### *Suggestions*

A 5-gal. pail of maraschino cherries should yield approximately 30 lb. of drained fruit and 22 lb. of juice. The shortening and butter should be 70 deg. F. Icings made from hard butter or shortening will not be smooth and will contain small lumps of hard fat.

If the stated weight of cherry juice is not available, make up the shortage with water.

Formula from General Food Sales Co., Inc.

FORMULA NO. 220

## Coconut Chocolate-Chip Cookies

| | |
|---|---|
| Shortening | 1 lb. 12 oz. |
| Fine granulated sugar | 1 lb. 10 oz. |
| Brown sugar | 13 oz. |
| Salt | ¾ oz. |
| Whole eggs | 1 lb. |
| Water | 4 av. oz. |
| Vanilla extract | 1½ av. oz. |
| Flour | 2 lb. 10 oz. |
| Soda | ¾ oz. |
| Semi-sweet chocolate chips | 4 lb. |
| Shredded coconut | 1 lb. 4 oz. |

### *Mixing Directions*

Cream shortening lightly. Add granulated and brown sugar and salt to creamed shortening. Cream together until fluffy or for about 2 minutes on second speed. Mix together eggs, water and vanilla extract. Add to the above mixture in three parts. Mix together thoroughly on second speed. Sift flour and soda into the above mixture. Mix at low speed for about 2 minutes. Do not overmix. Blend chocolate chips and coconut thoroughly by hand to avoid breaking the chocolate pieces.

### *Baking*

Use 18x26-in. sheet pans greased with plain shortening. Measure 8 oz. of batter per dozen cookies. Space cookies 2 in. apart. Bake for 10 to 12 minutes at 360 to 375 deg. F. Do not use excess bottom heat.

During production the shortening should be about 70 deg. F. Chocolate should be semi-sweet, high grade type, cut in pea-size pieces. The directions given are for a 3-speed machine. On a 4-speed machine use second and third speeds.

Formula from General Food Sales Co., Inc.

FORMULA NO. 221

## Maple Pecan Kisses

| | |
|---|---|
| Concentrated maple sirup (2½ fold) | 2 lb. |
| Fondant | 30 lb. |
| Invert sirup | 1 lb. |
| Chopped pecans | 3 lb. |

Melt down fondant in jacketed kettle. Add concentrated maple sirup, invert sirup and pecans and spoon out to form the home-made type of kiss. Use a good stiff fondant to avoid thinning out too much.

Formula from Quebec Maple Sugar Producers.

FORMULA NO. 222

## Chop Suey Cup Cakes

| | |
|---|---|
| Crumbs (fruit cake or other cake) | 5 lb. |
| Milk (liquid basis) | 5 lb. |
| Open-kettle molasses, highest quality | 8 lb. |
| Mincemeat* | 5 lb. |
| Nuts (pecans, walnuts, etc.) | 2½ lb. |
| Sugar (fine granulated) | 2 lb. |
| Shortening (preferably part butter) | 2 lb. |
| Salt | 2½ oz. |
| Eggs (whole) | 3 lb. |
| Flour | 10 lb. |
| Soda | 5½ oz. |

*Use moist, ready-to-use mincemeat or dry mincemeat that has been reconditioned.

Break up the fruit-cake crumbs, using a mixer. Add the milk, molasses, mincemeat and nuts, and mix smooth. Set this aside.

Cream the sugar, shortening and salt until light. While continuing the creaming, gradually add the eggs. Separately blend the flour and soda. Add portions of this blend along with portions of the crumb mixture. Mix until the dough is uniform.

Deposit in cup cake, heart- or oval-shaped chop suey and very small loaf forms. These small cakes are most attractive when topped with nuts and a cherry, or iced with chocolate icing.

Formula from Nulomoline Co.

FORMULA NO. 223

## Spiced Surf Smelts

| | |
|---|---|
| Fish (surf smelt) | 50 lb. |
| Salt | 7½ lb. |
| Sugar | 1¾ lb. |
| Laurel leaves | 1¾ oz. |
| Pimento | 1½ oz. |
| Clove | ¾ oz. |
| Ginger | ¾ oz. |
| Black pepper | ¾ oz. |
| Mace | ¾ oz. |
| Coriander | ¾ oz. |
| Cardamom | ¾ oz. |
| Thyme | ½ oz. |
| Cinnamon | ½ oz. |

### *Directions for Spicing*

This formula deals primarily with frozen smelts. The frozen smelts are carefully thawed out, washed and excess water drained off. When cleaning the smelts, it is best to cut out a piece that removes both pectoral fins. In order to obtain a tastier product, the viscera is also left in the fish.

Weigh out the various ingredients, mix well and roll smelts in the mixture. Pack in tubs of approximately 10-lb. capacity.

Sufficient brine should form within a few days to cover the fish. However, to insure that all the smelts come in contact with the brine, roll the tubs daily for approximately two weeks.

The smelts are pickled satisfactorily when the skin can be removed easily. Also when the flesh pulls away from the bones readily, leaving the backbone and viscera as waste. The pickling time required is between four to six weeks.

### *Bottling the Smelts*

A 16 percent brine, made from the same salt, makes an excellent pickle for the final bottling. The silvery appearance of the fillets adds to the attractiveness of the product. The smelts may be bottled with or without the skins and bones. The skinned and boneless fillets are much preferred.

(*Turn to page* 112)

# MERCK CONTRIBUTIONS IN THE VITAMIN FIELD

**1934** *Ascorbic Acid Merck (U.S.P.) was made available.*

**1936** *Vitamin $B_1$ was synthesized in the Merck Research Laboratories.*

**1937** *Vitamin $B_1$ Merck (Thiamine Hydrochloride U.S.P.) was made available.*

**1938** *Nicotinic Acid Merck (U.S.P.) was made available.*

**1938** *Vitamin $B_2$ Merck (Riboflavin) was made available.*

**1938** *Alpha-Tocopherol (Vitamin E) was identified and synthesized by Merck chemists and their collaborators in other laboratories.*

**1939** *Vitamin $B_6$ was synthesized in the Merck Research Laboratories.*

**1940** *Vitamin $B_6$ Hydrochloride Merck was made available.*

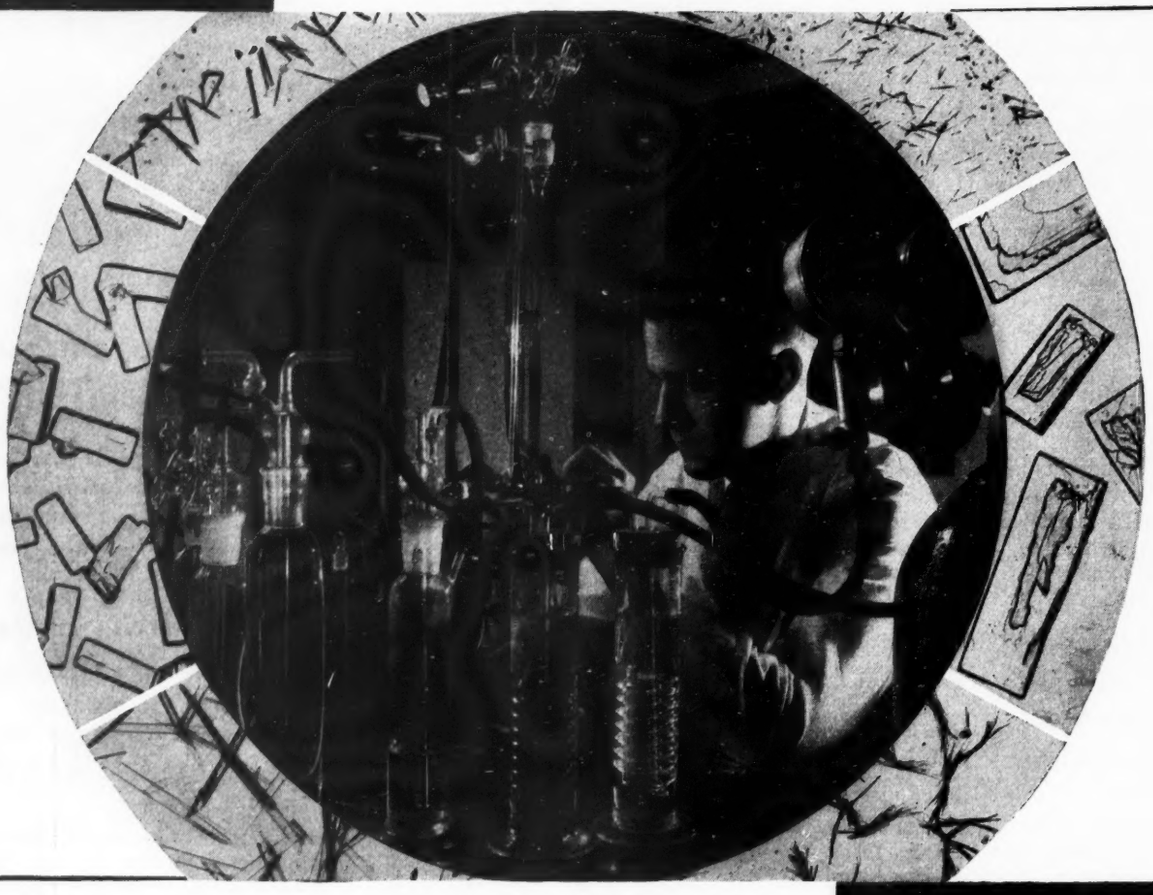
**1940** *Alpha-Tocopherol Merck (Vitamin E) was made available.*

**1940** *2-Methyl-3-Phytyl-1, 4-Naphthoquinone Merck (Vitamin $K_1$) was made available.*

**1940** *2-Methyl-Naphthoquinone Merck (Vitamin K Active) was made available.*

**1940** *Pantothenic Acid (Member of B Complex) was identified and synthesized by Merck chemists and their collaborators in other laboratories.*

**1940** *Calcium Pantothenate Dextrorotatory Merck was made available.*



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Formula from P. A. Sunderland, Pacific Fisheries Experimental Station, Prince Rupert, B. C.

FORMULA NO. 224

## Thick Chip Marmalade

In making this marmalade the chips, cut thicker than is ordinarily the case, are boiled soft, then cooled, and siruped in a cold solution of 1 part of glucose and 9 parts of sugar (25 Bé.) for 24 hours. The sirup is drawn off every other day and reboiled with the addition of a little fresh saturated sirup to give, in turn, densities of, say, 28 deg. and 32 deg. Bé., and finally 36 deg. Bé., as measured on the hot sirup.

Equal weights of siruped chips, orange pulp and sugar, together with a small quantity of water, are gently boiled to 224 to 226 deg. F., and well skimmed.

As already remarked, a proportion of lemons may be used along with the oranges. Marmalade may be also made with lemons alone, the preparation being the same as described for ordinary marmalade.

See also General Directions, Formula No. 205.

Formula from H. B. Cronshaw, London, England. Republication rights reserved.

FORMULA NO. 225

## Sweet Clear Marmalade

Yellow plums (or the pulp) are used in place of orange dummies. Equal amounts of sugar and plums are used. For example, 112 lb. of sugar is dissolved in the juice of 112 lb. of plums, filtered, and distributed among four boiling pans. To each pan is added 2 lb. of Seville orange shreds, and the mixture boiled to 223 deg. F. When ready to fill, flavor with essence of sweet orange.

See also General Directions, Formula No. 205.

Formula from H. B. Cronshaw, London, England. Republication rights reserved.

FORMULA NO. 226

## Grapefruit Marmalade

Scrub the fruit clean in hot water and cut away any dark portions of the skin. Quarter the peel; remove it, and pass through a chipping machine. Place the chips in a steam pan, cover well with water, and simmer for 15-20 minutes until tender. Drain off the water and transfer the chips to a 40-gal. vat. Return the drained water to the steam pan and add the dummies. Gently simmer till the pips are loosened, and pass through a pulping machine. Add the pulp to the chips and mix well. If the total amount is not 40 gal., add boiling water to bring it to this volume and mix well together.

210 lb. of grapefruit (requiring 500 lb. of sugar) is sufficient for ten boilings. Each boiling requires 4 gal. of grapefruit pulp and 50 lb. of sugar. Boil to 222½ deg. F.

See also General Directions, Formula No. 205.

Formula from H. B. Cronshaw, London, England. Republication rights reserved.

FORMULA NO. 227

## Cherry Icing

| | |
|---|---|
| Flour | 2½ oz. |
| Cream icing stock (Formula 132) | 5 lb. |
| Cherries (chopped) | 1½ oz. |
| Color (if desired) | to suit |

Add the above ingredients together and cream well. Use icing stock (Formula No. 132) to avoid stickiness.

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